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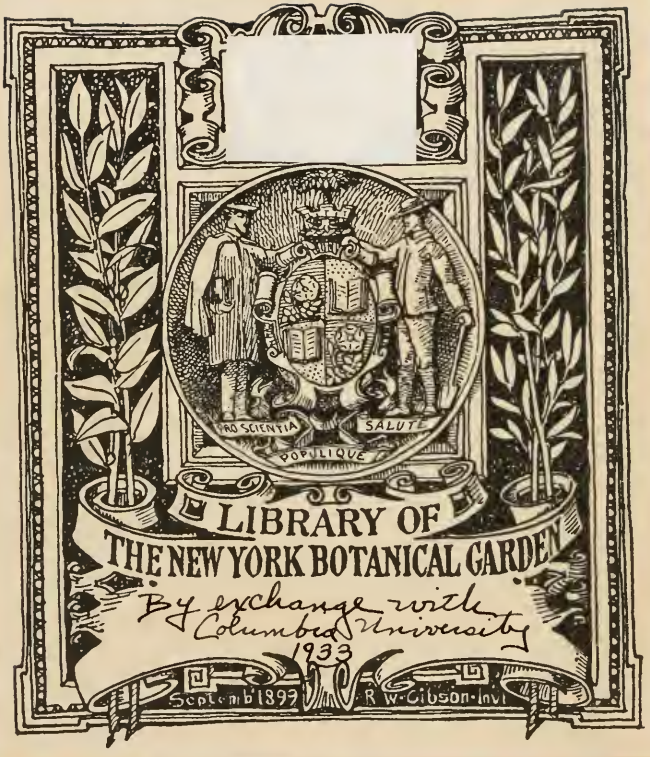
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Botanical Bulletin.

Vol. 1. NOVEMBER, 1875. *No. 1.*

Our Object.—With a good deal of diffidence we present this first copy of the Bulletin to our botanical friends. When the science of Natural History in all its departments has so many able journals devoted to its advancement, it would appear like presumption in us to make what may seem a useless addition to the list. Our aim at present, however, is by no means so lofty, but is simply to afford a convenient and rapid means of communication among botanists. Our little sheet is intended to be devoted to botanical discoveries and observations, and it is hoped that botanists will make use of it. The New England States and New York are well supplied with such means of communication, but we do not doubt that there are many interesting finds and notes west of those States that are only waiting some such opportunity as this to be presented to the botanical world. We do not wish, therefore, to be considered as setting up ourselves against our Eastern friends, but rather as supplementing their good work and aiding them, as far as is in our power, in the discovery of truth, after which we are all striving. We will assure our friends, who desire to make use of this sheet, of a wide circulation among botanists of such notes as they may send us. We shall welcome notes from all botanists and urge them to send us at once such articles as they wish published that they may appear in as early a number as possible. The Bulletin will be published every month and will be enlarged as necessity may demand. Hoping botanists will heartily approve of our undertaking and show appreciation of our efforts by a contribution of notes, we leave the Bulletin in their hands.—Editor.

Gentiana quinqueflora, Lam.—In my near neighborhood there is a steep hillside, facing the northwest and partly shaded by trees, where this beautiful gentian grows in great abundance and blooms profusely in the months of September and October. As observed for years past, it exhibits one feature worthy of special note—its diversity in size. Many of the larger plants, more or less branched, with branches usually short and strict, but occasionally elongated and spreading, terminated by cymose clusters of 2-5 flowers, frequently attain a height of full 20 inches. From these it descends by every gradation down to simple dwarfs of scarce 2 inches, which, with their single pair of leaves and 1-2 terminal flowers, remind the botanist of the pretty little alpines of the genus. This diminutive stature cannot result from sterility of soil, which sometimes dwarfs all vegetation, as on the serpentine-barrens of Southeastern Pennsylvania, nor from lack of moisture, for the Lilliputians are scattered amongst the Brobdignagians in such a way as to show that they enjoy just as favorable conditions for development. The cause of their dwarfing may lie in the fact of their later germination, or in the constitution of the plant, or in both. At all events, the diversity should be recorded in the description of the species, and, for its complete representation in the herbarium, all the forms should be collected. We have also some other annuals, which possess the same peculiarity in a marked degree. Prominent amongst them are *Erigeron Canadense*, L., *Lobelia syphilitica*, L., *Campanula Americana*, L., *Specularia perfoliata*, A. DC. and *Mimulus luteus*, L. The last is a striking example. Along the water-courses, high up in the

All communications addressed to John M. Coulter, Hanover, Ind.

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Rocky Mountains, may be found specimens more than a foot tall, laden with flowers, and, beside them, dwarfs of an inch or two, each bearing a single large, yellow flower, exceeding in size all the rest of the plant.—Prof. Thos. C. Porter, *Easton, Pa.*

Querci near Hanover, Ind.—In my botanical tramps this fall I have been very much attracted, and in fact, charmed by the oaks of this neighborhood. For some unaccountable reason these noble trees have never been satisfactorily determined. Many botanists have gone prowling around peering into every imaginable nook and corner for fear some diminutive little member of the vegetable kingdom may escape them, although it may be of no use to any one except a botanist. They never think of looking over their heads and studying the grander works of the plant kingdom, and of learning the names of things not only interesting to themselves but to every intelligent citizen in the land. I have met botanists who had on their tongues' ends the name of every shrub and herb, but who would have been compelled to yield to almost any intelligent farmer's boy if asked to name the trees. With the aid of a botanical friend I determined to give the trees of this region such an overhauling as they had never enjoyed. In the flora of Jefferson county, contained in the Report of the Indiana State Geological Survey for 1870, five Querci were reported for the county. In the list for 1874 the number was increased to six. We are now able to report with certainty nine species of the genus Quercus growing within an hour's walk of Hanover and hope to be able to report others from the county. The species are *Quercus alba*, L., *Q. macrocarpa*, Mx., *Q. bicolor*, Willd., *Q. Prinus*, L., var. *acuminata*, Mx., *Q. imbricaria*, Mx., *Q. coccinea*, Wang., *Q. coccinea*, Wang., var. *tinctoria*, Gr., *Q. rubra*, L., *Q. palustris*, DuRoi. *Q. alba* is by far the most common and valuable species. *Q. palustris* is used considerably for making clapboards and is one of the best marked species of the genus. The acorns are much smaller than those of any other of our species, are beautifully striped with paler lines and grow in most wonderful profusion. We noticed a tree upon which they were hanging in perfect clusters. It is reported that *Q. macrocarpa* is used for making shingles but I cannot vouch for the truth of this statement.—Ed.

Aster Novæ-Angliæ, L.—This large and beautiful Aster is found growing spontaneously in this neighborhood. It sometimes attains a height of eight feet, showing that the conditions of soil and climate are very favorable for its development. I have noted two things about this species that are not mentioned in any description I have seen. The first thing noticed when analyzing the flower was the strong, and to me, offensive odor coming from the heads, especially when bruised. I have been unable to decide what the odor most resembles, and think it must be *sui generis*. It is a little like camphor or turpentine, and probably is a mixture of several strong-smelling hydrocarbons. It is so characteristic that if a head of the plant was brought to me in the dark I could at once pronounce it to be *A. Novæ-Angliæ*. It is a pity that in dried specimens the fragrance is lost. Many plant odors are very characteristic, but are never mentioned because the plants have been described from dried specimens and the discoverer has made no note of the fact. Besides the odor of the plant just mentioned, I, call to mind the delightful fragrance of *Coreopsis tripteris*, L., the heads of which exhale most decidedly the odor of mignonette.

The second point noticed in regard to *A. Novæ-Angliæ*, was the wilting and folding in of the rays after sunset. I tried to get some good specimens one evening after sunset but could not find a single head among the hundreds I saw that did not look hopelessly wilted. This is one of the finest illustrations of the so-called "sleep of plants" to be seen in this region.—Ed.

Notes on certain species of the genus Asplenium.—This genus of Filices figures somewhat largely here when compared with other genera, not only in its number of species, and their distribution, but also, in general interest. Of the Asplenia we

number four species. Of these at least one may be classsd among botanical rarcties, while another deserves attention for its geographical distribution. Our most common species is *A. Filix-fœmina*, Bernh., and it may be said to inhabit Jefferson county generally, but as yet I have not been able to detect it upon the river bluffs of the Ohio or in the ravines running back from it. It rather selects fence-rows of the moist and flat uplands, while it is not uncommon in the upland woods. As noted by Professor Eaton in the Filices of Gray's Manual, we find this species extremely variable here. The fronds often have the pinnæ of the terminal quarter lance-linear. The pinnules of the lower pinnæ range through ovate, oblong, and lance-linear with the tooth at the base of the upper margin prominent. The confluent pinnules often give an interrupted, ridgy and channelled appearanee to the secondary axis by an epidermal rise along their midrib which passes along the secondary axis to the pinnule below. The stalk is chaffy below and more or less glandular (?) hairy throughout, as is also the secondary axis. This feature is more decided in the immature fronds.

A. thelypteroides, Mx., is decidedly local. Besides "3–6 pairs" (or less) of fruit dots, there is occasionally an additional odd lot. The margins of the lobes of the pinnæ seem to have a strong disposition to turn under, like *Adiantum*, thus concealing the small teeth. The stalks are quite long and chaffy hairy. We also notice that to a limited extent the ridges of the secondary axis (spoken of under *A. Filix-fœmina*) still exist, but in a reversed order, being more prominent upon the upper surface of *A. Filix-fœmina*, and upon the lower surface of *A. thelypteroides*.

A. angustifolium, Mx. is interesting as being found in Southern Indiana. It is an inhabitant of cooler regions, and here it seeks the dampest and coolest portions of the ravines running back from the Ohio river and is always found encircled by a rich carpet of moss to shield its roots from heat and retain sufficient moisture. It is by no means abundant, and indeed, this remark will apply to all our Ferns with the exception of three or four species. Pinnæ of the sterile frond are quite abrupt at base, those of the fertile less so. Very frequently the fronds that are sterile in general appearance and character will bear a few fruit-dots upon a half dozen pairs of pinnæ.

Lastly, we would mention our most interesting species, *A. Ruta-muraria*, L. This species, as far as we can discover, is very local. It has been found attached to the limestone cliffs of the Niagara Epoch in but one locality, embracing a range of 300 or 400 yards in length. It also seems to confine itself to a narrow vertical range of about 15 or 20 feet. We have also observed that this same vertical range applies to *Pellæa atropurpurea*, Link. *A. Ruta-muraria* has been found this year growing in greater abundance than ever observed before, due, perhaps, to an unusually wet season. In dry seasons, being very much exposed to the direct rays of the sun, it rapidly shrivels up and thus escapes observation. Its hold upon the rocks is very close, as it sends out dozens of small thread-like rootlets, which penetrate readily into the minutest crevices. Speaking of the roots we would mention a very interesting observation of our own which we have not seen recorded. The scales of the stipe are quite densely aggregated at its base and are objects of great beauty. We would describe them as being *pellucidly-netted, lance-linear and filiformly-pointed.* The duration of these ferns in their perfection of beauty and color depends somewhat on the approach of frost. *A. thelypteroides* and *A. angustifolium* seem to be quite sensitive to the cold and bleach with our first frosts. *A. Filix-fœmina* is much hardier and together with the last two may be ranged from July to November. The little *A. Ruta-muraria*, however, seems to partake of the nature of an evergreen here, having been observed from March to December and, as far as we could judge, not affected by the keenest frosts. A. H. Young, *Hanover, Ind.*

[We can vouch for the correctness of this last observation, and have thought for some time that *A. Ruta-muraria* must undoubtedly be an evergreen.—Ed.]

List of Plants Collected in the Black Hills during the Summer of 1874.—The following plants were collected by Prof. Donaldson while connected with Gen. Custer's Expedition to the Black Hills during the season of 1874. The collection was necessarily very hasty and of course meager, embracing about 80 species of plants. The collection was sent to the writer by Prof. N. H. Winchell, of Minnesota, and was retained and reported on. The bare list is here presented to botanists, not to forestall the regular report, but as it may be of interest to know what botanical work was done upon an expedition otherwise rather famous. A few of the species, of uncertain determination, are in the hands of Prof. T. C. Porter, and will be noted hereafter if they necessitate any change in the list:

Aconitum nasutum, Fisch.
Linum perenne, L.
Geranium Fremontii, Torr.
Lupinus ornatus, Dougl.
Lupinus parviflorus, Nutt.
Lupinus leucophyllus, Lindl. (?)
Hosackia Purshiana, Benth.
Petalostemon violaceus, Mx.
Petalostemon candidus, Mx.
Astragalus adsurgens, Pall.
Astragalus pictus, Gr.
Glycyrrhiza lepidota, Nutt.
Potentilla arguta, Pursh.
Spiræa betulæfolia, Pall.
Epilobium angustifolium, L.
Œnothera pinnatifida, Nutt.
Œnothera cæspitosa, Nutt.
Œnothera serrulata, Nutt.
Gaura coccinea, Nutt.
Mentzelia nuda, T. & G.
Mamillaria vivipara, Haw.
Opuntia Missouriensis, DC. (?)
Carum Gairdneri, Benth. & Hook.
Galium boreale, L.
Liatris scariosa, Willd.
Liatris punctata, Hook.
Aster multiflorus, Ait.
Machæranthera canescens, Gr.
Erigeron Canadense, L.
Erigeron macranthum, Nutt.
Erigeron glabellum, Nutt.
Erigeron divergens, T. & G.
Solidago Virga-aurea, L., var.
Solidago nemoralis, Ait.,
var. *mollis*, Bartl. (?)
Solidago Missouriensis, Nutt.
Solidago Canadensis, L.
Bigelovia graveolens, Gr.
Aplopappus spinulosus, DC.
Grindelia squarrosa, Dunal.
Chrysopsis villosa, Nutt.
Rudbeckia hirta, L.
Echinacea angustifolia, DC.
Lepachys columnaris, T. & G.
var. *Tagetes*, Gr.
Helianthus petiolaris, Nutt.
Helianthus lenticularis, Dougl.
Gaillardia aristata, Pursh.
Chænactis Douglasii, Hook. & Arn.
Achillea Millefolium, L.
Artemisia dracunculoides, Pursh.
Artemisia Ludoviciana, Nutt.
Crepis runcinata, T. & G.
Macrorrhynchus troximoides, T. & G.
Mulgedium pulchellum, Nutt.
Campanula rotundifolia, L.
Arctostaphylos Uva-ursi, Spreng.
Lysimachia ciliata, L.
Pentstemon glaber, Pursh.
Pentstemon acuminatus, Dougl.
Pentstemon pubescens, Soland.
var. *gracilis*, Gr.
Mimulus luteus, L.
Castilleia pallida, Kunth.
Monarda fistulosa, L.
Lophanthus anisatus, Benth.
Stachys palustris, L.
var. *cordata*, Gr.
Gilia pungens, Benth.
Collomia linearis, Nutt.
Cuscuta decora, Eng. (?)
Oxybaphus nyctagineus, Sweet. Form.
Paronychia sessiliflora, Nutt.
Eriogonum multiceps, Nees.
Zygadenus glaucus, Nutt.
Calochortus Nuttallii, T. &. G.
Boutelona oligostachya, Torr.
Triticum caninum, L. Ed.

Botanical Bulletin.

Vol. 1. DECEMBER, 1875. *No. 2.*

SALIX CRISPA.—S. BABYLONICA.—On the grounds of Hon. E. Scudder, Trenton, N. J., are two old willows, *S. crispa* and *S. Babylonica*. The height of the curly willow is about forty feet, and that of the weeper about fifty-five. Between the nearest branches of the two is a distance of about twenty-five feet. The topmost branch of the curly willow, on the side of the tree next to the weeper, is a bough densely covered with leaves. It is about six feet thick and ten feet long. The curious fact is that while the whole tree has the perfect habit of *S. crispa*, this entire bough has the perfect habit of *S. Babylonica*. The long pendent branchlets or twigs, and the leaves in every respect are those of the weeping willow. And this is true not only of the form and habit of the leaves, but with positive exactness also as to color. The true *crispa* leaves are dark and shiny above, and almost a chalky white underneath. The pseudo *Babylonica* leaves are pale yellowish green above and still paler, perhaps pea green, underneath. I compared them with the leaves of the neighboring *Babylonica*, and, excepting perhaps that the leaves of the freak were a little smaller, a fact of no consequence, there was no difference whatever. To the spectator this great branch seems to be a graft, which is not so. It is an interesting evidence of the identity of species in the curly and the weeping willow. Supposing *S. Babylonica* to be the ancestor, we have here the long dormant inherited force asserting itself, and proclaiming the parentage of *S. crispa*. That is, the curly willow is but a variety of the weeping willow.—DR. SAMUEL LOCKWOOD, *Freehold, N. J.*

DOUBLE FLOWERS.—The florist by his art is able in many cases to bring about retrograde metamorphosis, by which the petals are multiplied at the expense of the stamens, and produces thus his so-called double flowers. Nature sometimes does the same thing, but rarely, and all such instances are worthy of note. A few that have fallen under my observation are here put on record. From the woods in the neighborhood of Lancaster, Pennsylvania, I obtained a stalk of *Thalictrum anemonoides*, MX., now growing in my garden, whose flowers have nearly all the stamens converted into petals. They are very delicate and beautiful, and look like miniature white roses, faintly tinged with pink. From the late Mr. Diffenbaugh I have specimens of *Ranunculus repens*, L., collected near Camden, N. J., which show an additional whorl of petals, making 10 in all. *Saxifraga Virginiensis*, MX. has also been found on the Delaware below Easton with supernumerary petals. But the crowning example is furnished by *Sagittaria variabilis*, Engelm. Some years ago, when botanizing on an island in the Susquehanna, below Harrisburg, I came upon a large patch of this plant standing up strong and luxuriant from a bed of rich, black mud. Amongst the abundant flower-stalks, I gathered 8 or 10 on which all the pistils in the pistillate flowers and all the stamens in the staminate flowers were replaced by petals, so that both the staminate and pistillate flowers presented the appearance of tiny snow balls. The next season I visited the spot with the intention of securing more specimens, but failed to find one.—PROF. THOS. C. PORTER, *Easton, Pa.*

All communications addressed to John M. Coulter, Hanover, Ind.

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CYCLOLOMA PLATYPHYLLUM, Moquin.—While collecting fish with Prof. D. J. Jordan in Fall Creek, a tributary of White River, in October, we found *Cycloloma platyphyllum*, Moq. well established in the low sandy banks. This seems to be its most easterly station yet reported. In the same month we found in our door yard *Nasturtium sessiliflorum*, Nutt. It continued in blossom until the frosts had killed many plants usually ranked hardier. *Dactyloctenium Ægyptiacum*, Willd. is well settled in many of our streets, a somewhat northerly station I believe.—PROF. HERBERT E. COPELAND, *Indianapolis, Ind.*

DIARRHENA AMERICANA, Beauv.—Last summer while collecting *Sullivantia Ohionis*, T. & G. in Clifty Ravine, a gorge running back from the Ohio River, I noticed large bunches of a beautiful grass growing along the side of a narrow foot-path running at the foot of some high cliffs. The leaves were large and brilliant green and grew in dense tufts at the base of a long weak culm, bearing at the top a few spikelets. The species proved to be *D. Americana*, Beauv., a new grass for this neighborhood. There are one or two characteristic features about it, in addition to those mentioned in Gray's Manual, that may be of interest to botanists. The margins of the leaves and the axis of inflorescence are *rough backwards*, almost as much so as the stems of some species of *Galium*. The prominent nerves on the upper surface of the leaves and the glumes are also rough backwards, but rather less so. The under surface of the leaf is smooth and lighter in color than the upper. This species was growing in shady, damp, limestone soil and the tufts were as close together as they could stand, with some culms at least four feet long. At the top of the cliff, and running back upon the flat lands, *Kyllingia pumila*, Michx. grows in the greatest profusion, sometimes forming a dense carpet over the ground for rods.—ED.

EUPHORBIA MARGINATA, Pursh.—This western Euphorbia has become thoroughly naturalized in this neighborhood. Acres of it grow upon the gravelly hills about Madison, making them look as if covered with white blossoms. The plants are strong and thrifty, some attaining a height of more than three feet and profusely branching. It seemed to make its appearance quite suddenly a few years ago, but is spreading with wonderful rapidity, covering only such hills and parts of hills as have been cleared of timber and are covered with sand and gravel. Its special fondness seems to be for some old railroad cuts where piles of debris have been thrown out, and, weathering, have made a soil of suitable composition. It thus shows its fondness for the great sandy plains it has left so far to the west of us.—ED.

NOTES ON SOME INTERESTING PLANTS FOUND IN JEFFERSON COUNTY.—In our summer excursions we have found quite a number of plants either of local occurrence, unreported range, or rare, the reporting of which we have thought would prove of interest to Botanists. *Hydrastis Canadensis*, L., has been observed in quite a number of places, but its abundance upon the hills of the Ohio River seems to designate them as a place most favorable for its growth. In all our observations we have rarely found an isolated individual of this species, but it usually appears in small patches of 50 to 100 individuals.

Polanisia graveolens, Raf. abounds along the roadsides near the river. It nearly always bears two, and often three sorts of leaves upon the same stem. The usual specimens bear simple oblong to ovate leaves in the upper portion of the plant, sometimes succeeded by binate leaves, while the lower are nearly always ternate. We notice *Viola lanceolata*, L. credited in the Manual of Botany to a greater abundance eastward than westward, but the quantity here is remarkable, it being not uncommon to see a plot of one or two acres white with its blossoms. Some specimens of this species seemed to me so remarkably large that I measured a few. I found six to seven inches to be quite a common length, while I have one before me whose scape is nine inches long. Three years ago the writer collected at the "Knobs," about thirty miles distant, some specimens of *Lechea minor*, Lam.

Hibiscus Moscheutos, L. was observed here last August, beautifully in flower. We were a little surprised at finding it where we did, as there were none of those accompanying saline influences to be noticed with which this plant is usually associated. Within half a mile of it, however, is a spring showing but slightly the presence of Sulphur in its water, but a hollow log sunk for a cistern gives ample evidence that the percentage of this element is by no means small. We also tried hard to imagine that in a small degree we experienced the peculiar nauseating effect of the well known Magnesia Sulphate. Whatever the effect of these spring waters, the occurrence of this plant here is interesting. The locality is far removed from the traveled highways and also from the means of transporting seeds common to a thickly populated district. *Xanthium spinosum*, L. is gradually assuming a local importance with us, but how long it has thus been insidiously establishing a firm foothold we do not know, but we do know that it was not scarce ten years ago. So far it has spread only along our public roads and this would seem to point to an arrival by transportation and at no distant time. *Bidens cernua*, L. seems rather a late arrival, as we marked its appearance for the first time along the river banks about the beginning of September. Perhaps the extraordinary floods of the early summer swept down the seeds from the tributaries of the upper Ohio. *Artemisia biennis*, Willd. was also collected along our roadsides, thus leading us to remark its progress southward as well as eastward. *Onopordon acanthium*, L. is another rare and local plant. We have also met a small shrub supposed to be *Ilex mollis*, Gray. *Plantago lanceolata*, L. is becoming a frequent intruder in our meadows and pastures and is associated with *P. major* about our dwellings.

Seymeria macrophylla, Nutt. occurs in abundance upon the river bluffs from July to October. *Gerardia purpurea*, L. appears this season along our roadsides, apparently for the first time, as its localities have been beaten over time and again during the past six or seven years by the Editor, and also the writer, without previous discovery. Its appearance so far inland may be worthy of note, as recorded stations place it nearer the coast or the neighborhood of the great lakes. *G. tenuifolia*, Vahl. is becoming very abundant in some of our old fields. *G. flava*, L. appears as a rarity. *Pedicularis lanceolata*, L. was collected during August, in considerable abundance in a single swampy locality. The contribution upon plant odors by the Editor in the initial number of the BULLETIN, calls to mind a striking and delightful corroboration of its value in the *Melissa officinalis*, L., which is very local, and whose sweet perfume, something between the Rose Geranium and Lemon Verbena, has afforded the writer many a pleasant inhalation. Even though digressing we are tempted to call attention to the exquisite odor of the little *Gratiola Virginiana*, the delicate nectary sweetness of the rare *Orchis spectabilis*, and the pleasing perfume of *Ptelea trifoliata*, although in the latter we differ from the authorities.

Synandra grandiflora, Nutt., whose name implies its living beauty, is a very rare inhabitant of our county. *Mertensia Virginica*, DC. with its large drooping clusters of white, pink and purple flowers adorns many a southern slope of the river bluffs. Among the *Hydrophyllaceæ* are *Hydrophyllum macrophyllum*, Nutt., *H. appendiculatum*, Mx., *H. Canadense*, L., and *Phacelia bipinnatifida*, Mx. *Phlox divaricata*, L. is frequently met with from March to May in the rich woods and thickets that have a southerly exposure although this plant is given a mountainous or more northern distribution. A single specimen of *Obolaria Virginica*, L. has been detected. Specimens of *Asclepias quadrifolia*, Jacq. are frequently met with from April to June, but not in any abundance. *Enslenia albida*, Nutt. is fast becoming established in the vicinity of the Ohio River.

Euphorbia marginata, Pursh. is very plentiful on some of the river hillsides near Madison, Ind. It is associated with *Xanthium spinosum*, and may have had a similar introduction. Its spread has been more rapid than that of the *Xanthium* during the past decade and now it ranges over many acres of the hilly ground, while it slowly but surely is creeping upwards to the level ground, where in a few years

we may hear of it as a troublesome weed. Its milky juice is very abundant and may some day yield, in its gum, to investigating industry, an ample return for its cultivation. Those who have occasion, however, to handle it, had better not do so with abraded skin, and should be careful not to convey any to the mouth, as the principle, Euphorbin, is exceedingly irritating in minute quantities and may be fatal in large portions. Of *Celtis Mississippiensis*, Bosc. we have met a single bush about eight feet high. Of the *Orchidaceæ* we list *Orchis spectabilis*, L., *Habenaria psycodes*, Gr., *H. peramœna*, Gr., *Spiranthes cernua*, Richard., *S. gracilis*, Big., *Corallorhiza odontorhiza*, Nutt., *Aplectrum hyemale*, Nutt., and *Pogonia pendula*, Lindl. The last of these is here found among the leaf debris of thick beech woods and so nearly covered that unless one discovers it by mere accident, he may look for a whole season in vain. The "Knobs" also yielded us *Agave Virginica*, L., which occurs there in some abundance. Among *Liliaceæ*, *Erythronium albidum*, Nutt. and *Allium tricoccum*, Ait. are perhaps the most interesting in their distribution.

Such are a few of the more interesting species of between 800 and 900 flowering plants the Editor and myself have collected in Jefferson County during the past half dozen years. To these we have added about 150 *Cyperaceæ* and *Gramineæ* and probably 75 to 100 species of *Musci*. Any notes upon these will be reserved for another paper.—A. H. Young, *Hanover, Ind.*

Dentaria laciniata, Muhl.—This crucifer grows here in great abundance and luxuriance. It is one of our earliest spring flowers and one of the most variable and perplexing species I have ever met. A long list might be made of the various forms in which it occurs. *D. maxima*, Nutt., *D. heterophylla*, Nutt., *D. laciniata*, Muhl., and *D. multifida*, Muhl. undoubtedly run together in this locality. Specimens of these different species have been found growing in the same patches and even from the same root! The leaves vary from almost entire to finely dissected. In some specimens there are three leaves in a whorl; in some these leaves are alternate; in some there are four alternate leaves; often there are but two leaves, opposite or alternate. In short, there is no kind of division or position of leaves which is not represented in this species. I would like to know if any botanist has had a similar experience, or whether all these variations are due to the unusually favorable conditions of soil and climate. If such perplexing intermediate forms are met with wherever the plant occurs, these several species should certainly be reduced to one, and some such name as *D. heterophylla* given to it.—Ed.

A Query.—In looking over the Botany of a friend I find among other notes written upon the fly-leaves the following:

Comptonia asplenifolia, Ait. Thousands of acres in Michigan, hitherto deemed utterly worthless because densely covered with a growth of "Sweet Fern," prove to be very valuable, as this plant is a much more powerful astringent than hemlock and far superior to it for tanning purposes, yielding forty per cent. of tannin where hemlock yields but fourteen.

Has anything been done to prove the truth or falsity of this observation? It seems to be floating around in the newspapers without any special authority.—Ed.

Contributions of notes are desired from all botanists, and such notes as are accepted will appear in the *number of the Bulletin issued immediately after their receipt*, as it is not intended to limit the size of the paper to four pages if the amount of matter will justify an enlargement.

Botanical Bulletin.

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Quercus heterophylla, Michx., Bartram's Oak.—Gray remarks that this oak is apparently a hybrid between *Q. Phellos*, L. and *Q. tinctoria*. Bartram. Some years ago I discovered a tree in Shelby County, Mo., where it somewhat resembled *Q. palustris*, Du Roi. I also discovered a small tree in De Kalb County, and two years ago another in Sullivan County. Other oaks growing near by at the latter place were *Q. tinctoria*, Bart., *Q. imbricaria*, Mx and *Q. nigra*, L. The leaves present all forms from an almost entire leaf to a lobed one, their margin often only sinuate. If, as Gray suggests, it may be a hybrid, the general resemblance to forms of *Q. imbricaria*, Mx. and *Q. palustris*, L. seemed immediately apparent to me.—G. C. Broadhead, *Pleasant Hill, Mo.*

Callirrhoe digitata.—In 1857 I observed this plant growing on a dreary glady magnesian limestone soil in Lawrence County, Mo. I did not again see it growing for sixteen years, but its regal beauty was still present in my memory through the long space of those years. In 1873, passing from the sandy prairies of Barton County, I suddenly found the soil change to a black limestone soil, and with it I found the well remembered beauty of former years—my Callirrhoe. I found it quite abundant on the limestone soil of Jasper County. Its general height is about three feet, with occasional branches six inches to a foot in length, having leaves at their base much resembling those of the *Delphinium*, and beautiful purple flowers of about an inch in length at the end of each branch. It has been found in no part of Missouri but the southwest.—G. C. Broadhead.

An Interesting Herbarium.—I received a communication during last fall from the officers of the Natural History Society, of New Albany, asking me to come down and arrange the herbarium of Dr. Clapp. I have just returned from spending some two weeks there and must say that I was very much gratified with the treasures turned up, making an invaluable addition to the flora of Indiana. Judging from the labels the collection was made by Dr. Clapp principally in 1835 and 1836. It seems to be very exhaustive for a region of country with a radius of about fifteen miles, having New Albany as a center. As the Falls of the Ohio come within this circle some very local and interesting plants were met with, such as *Psoralea Onobrychis*, Nutt., *P. stipulata*, T. & G., *Vitis indivisa*, Willd., *Aster azureus*, Lindl., *A. Shortii*, Boott., *Solidago Shortii*, T. & G., *S. rupestris*, Raf., the beautiful little *Iris cristata*, Ait. and many others which might be enumerated. Besides, there were some species noted as being found near New Albany that were not included in Gray's Manual. For instance, there were several specimens of *Iris hexagona*, Walt. labeled as growing near the Falls. From what are called the "Barrens" the largest display of *Ericaceæ* and *Orchidaceæ* was obtained that I have ever seen from any locality in Indiana. The Doctor made very liberal collections, especially of desirable plants, and consequently a good stock of duplicates fell into my hands. His specialty seems to have been *Cyperaceæ* and *Gramineæ*, and his herbarium made an exceedingly fine showing in these families, containing a very

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complete set of Dr. Gray's Grasses and Sedges. I was informed by Dr. Sloan, President of the Nat. Hist. Soc., that Dr. Clapp began his botanical investigations when his eyesight had about failed him and he was compelled to do something to engage his attention and keep him in the open air as much as possible. If he had been driven into the study of botany earlier in life he might have established in New Albany an exceedingly fine herbarium, for he had obtained many good exchanges, and was in correspondence with the most eminent botanists of his day. Among other exchanges were sets of plants from Louisiana and Ohio sent by Dr. Riddell. The collection was bundled up at Dr. Clapp's death and the dust of many years was allowed to collect upon it. It remained entirely undisturbed until within a very few years and only now is it in complete order, with modern nomenclature and modern paper, ready for use.—Ed.

Some plants out of their accredited range.—While in Wisconsin I noticed some plants away from their accredited range. *Isopyrum biternatum*, T. & G. is abundant in the northern part of Walworth County, where also *Cassandra calyculata*, Don. is found in many of the tamarack swamps. *Napæa dioica*, L. has several stations, to my knowledge, in Green County. On the track of the M. & St. P. R. R., between Janesville and Hanover, in Rock County, I found *Cenchrus tribuloides*, L., *Frœlichia Floridana*, Moquin and *Cacalia suaveolens*, L., the latter growing abundantly near the Junction depot at Hanover, far from "rich woods."—Herbert E. Copeland, *Indianapolis, Ind.*

Œnothera speciosa.—This plant is abundant from Jackson County, Missouri, southward, but is not found east. It generally prefers a rich limestone soil of but a few inches thickness resting on limestone. When in full bloom its corolla is often over three inches across, and a bed of these plants, a half acre or more in extent, with their pure white flowers, is very beautiful.—G. C. Broadhead.

On the size of forest trees in Jefferson County, Ind.—During the summer of 1873, in the prosecution of some botanical work in Southern Indiana, I was led to observe the size and character of the forest trees by the numerous questions asked me on the subject by the farmers in the region worked up. I here present a condensed view of the results obtained by the measurement of over 1000 trees in Jefferson County. The measure of the diameter was taken three feet above the ground. The numerals in brackets following the name indicate the number of trees measured.

Fagus ferruginea Ait. [400]	Average diam.,	2	feet	8	in.,	average	height,	65	feet.
Quercus rubra, L. [150]	"	"	3	"	2	"	"	"	69	"
Quercus alba, L. [150]	"	"	3	"	2	"	"	"	69	"
Liriodendron Tulipifera, L. [150]	"	"	3	"	6	"	"	"	87	"
Acer saccharinum, Wang. [100]	"	"	2	"	6	"	"	"	70	"
Acer rubrum, L. [100]	"	"	2	"	6	"	"	"	70	"
Platanus occidentalis, L. [75]	"	"	4	"	9	"	"	"	83	"
Ulmus Americana, Willd. [75]	"	"	3	"	4	"	"	"	70	"
Æsculus glabra, Willd. [50]	"	"	2	"	9	"	"	"	68	"
Æsculus flava, Ait. [50]	"	"	2	"	9	"	"	"	68	"

The largest tree found in the county (*Platanus occidentalis*, L.) measured at the base 13 feet-6 inches Some 10 feet up the trunk the diameter was 8 feet-4 inches, and 25 feet from the ground measured 6 feet. The height of this giant tree could not be ascertained, as it had been broken by storms. *Fagus ferruginea*, Ait. and *Liriodendron Tulipifera*, L. attain a size at times I have not seen equalled in any other part of the state. I have noted several of the latter species between 8 and 10 feet in diameter. Of the former a diameter of 5 feet is not uncommon, and I have two noted that exceed 6 feet. Some few items concerning the numerical relation which the different species bear to one another, will be reserved for subsequent notes.—M. S. Coulter, *Logansport, Ind.*

FERNS OF LEAVENWORTH COUNTY, KANSAS.—The following is a list of the ferns I have found in Leavenworth County, Kansas:

Adiantum pedatum, L.
Aspidium Goldianum, Hook.
Asplenium angustifolium, Michx.
Asplenium Filix-fœmina, R. Br.
Botrychium lunarioides, Swartz.
Botrychium Virginicum, Swartz.
Camptosorus rhizophyllus, Link.
Cystopteris fragilis, Bernh.
Onoclea sensibilis, L.
Onoclea sensibilis, L., var. *obtusilobata*, Torr.
Pellæa atropurpurea, Link.
Woodsia obtusa, Torr.

Adiantum pedatum, L., the most beautiful of all our North American ferns, is very abundant in Leavenworth County, growing luxuriantly on the wooded slopes and in the ravines of the Missouri bluffs, from Wyandotte to Atchison.

Aspidium Goldianum, Hook. is a large and stately fern, but not so graceful as many others, nor plentiful in this neighborhood.

Asplenium angustifolium, Michx. This graceful fern, common enough in some states, is not plentiful in Kansas. I have found it in only a few places in this and Wyandotte Counties, and now that the grand old trees are rapidly disappearing from the romantic ravines and lofty banks of the Missouri river, I am afraid that in a few years my sylvan pets will disappear also.

Asplenium Filix-fœmina, R. Br. I have found only one plant of the elegant Lady fern in this county. It may however be in places that I have not visited, for my fern hunts, although numerous, have not been extensive.

Botrychium lunarioides, Swartz. Of this interesting little plant I have found only a few specimens, growing with *Botrychium Virginicum*, Swartz. which in this county is very abundant, frequently found in shady hazel thickets, its fleshy stipe and thick fibrous roots deeply embedded in the rich vegetable mould. In such localities specimens are to be found fully two feet high.

Camptosorus rhizophyllus, Link. This curious little walking fern is not uncommon with us on the crumbling calcareous rocks that serve as homes for many a thriving colony of this industrious little pedestrian.

Cystopteris fragilis, Bernh. This is the first fern that appears in the spring, and by far the most abundant in Kansas. Sometimes I have noticed it as early as the first of March, pushing its pretty little curly head through the soft vegetable mould, and early in April, on the northern slopes of the Missouri bluffs and along the wooded water-courses you may find them by the acre, full grown ferns quivering in the soft spring sun-light.

Onoclea sensibilis, L. This peculiar looking fern, with its broad sterile frond and fruit-bearing spike, is very common with us. In low, damp situations it is frequently to be seen two and a half feet high. Its delicate light green fronds wilt immediately on being gathered and wither at the slightest touch of frost, hence, probably, its popular name, "Sensitive Fern."

O. sensibilis, L., var. *obtusilobata*, Torr. A few years ago I found within the city limits of Leavenworth a solitary plant of this variety and transplanted it to my out-door fernery, but unfortunately lost it during an unusually dry season.

Pellæa atropurpurea, Link. In keeping with its favorite *habitat*, the weather-beaten faces of limestone rocks, this little evergreen has rather a hard, dry look. It is not uncommon in this county, being often found in company with the *Woodsia obtusa* and "Walking Fern."

Woodsia obtusa, Torr. This beautiful little fern grows abundantly in the vicinity of Leavenworth. With us it is a partial evergreen, and gives out new fronds very late in the season.—JAMES WILSON, *Leavenworth, Kansas.*

SOME EFFECTS OF THE UNUSUAL SEASON.—The month of December, 1875, has been a remarkable one. From the first to the ninth the thermometer recorded here an average temperature of 45 deg. to 50 deg. Then until the nineteenth the temperature fluctuated above and below freezing point, never far from it. From

that date to January 3d, was a period of unprecedented warmth, the thermometer ranging from 40 deg. to 80 deg., with an average of about 50 deg. During that time some of our early plants were induced to put in their appearance and some of our constant bloomers bloomed on. *Lamium amplexicaule* came up in my yard in a vigorous growth, hundreds of purple buds were almost ready to burst and some had opened. *Ornithogalum* and *Narcissus* appeared above the ground two or three inches. Some early roses put out leaves and a few flower buds. *Lonicera sempervirens* had many full grown leaves and any quantity of leaf buds. *Cydonia Japonica* was in full bud and in a few instances in flower. Snapdragons were all in leaf and ready to bloom. And so I might enumerate many other instances of such unseasonable growth. These instances have not been confined to our own section, but word has been received from the more northern counties that the same condition of things prevails there. Prof. Herbert Copeland writes from Indianapolis that he "found *Capsella Bursa-pastoris* in blossom December 31st, near Fall creek in Marion County "—Ed.

Some interesting Cryptogams found near Painesville, Ohio.—From a recent letter received from Dr. H. C. Beardslee, of Painesville, Ohio, I feel free to make the following extract:

"In 1872 I discovered a moss, the *Discelium nudum*, Dickson, a species not uncommon in Europe but first detected in the United States by myself. In 1873 I detected *Fissidens hyalinus*, Hook. & Wilson, which was found near Cincinnati, Ohio, in 1832 by Mr. T. G. Lea and which had been detected nowhere else. It was regarded by Sullivant and Lesquereux as lost and dropped from their Catalogue of 1865. In the fall of 1874 I discovered *Riccia Frostii*, Austin, a Rocky Mountain species discovered in 1873. I found it only sparingly. It is a matter of some surprise that this new Rocky Mountain species should occur here at home."—Ed.

Some plants noted in Carroll County, Indiana.—While spending a few weeks in July in Carroll County, in the northern part of the state, I was much pleased with the region in a botanical point of view. My interest did not arise so much from the plants actually collected as from the seeming capabilities of the region. It is one of those low lying rich counties that border the Wabash River from source to mouth, full of thick woods and swamps, with occasional patches of open prairie land. The Wabash Valley has never been botanically explored and a rich harvest is waiting to be reaped. Along the lower Wabash we seem to run into a flora almost southern in its nature. Swamps filled with the Bald Cypress (*Taxodium distichum*, Richard.), with Cypress "knees" standing up eight or ten feet in height cover for acres the lower Wabash Valley. In Carroll County we found growing by the acre *Napæa dioica*, L. It was bordering a large swamp, rising four to five feet in height, its large clusters of white flowers and huge palmately parted leaves making it a very marked plant. *Psoralea Onobrychis*, Nutt. was found growing in profusion overhanging sluggish streams, its beautifully characteristic pods well developed and fixing its identity beyond dispute.

Echinacea purpurea, Mœnch. flashed on us from the fence corners, its tall showy purple heads reminding us of the near lying prairie. Beside it was *Lepachys pinnata*, T. & G. of similar *habitat*. *Silphium terebinthinaceum*, L. and *S. perfoliatum*, L. invited us to try to reduce to herbarium shape their rough ungainly forms and *Nabalus crepidineus*, DC. nodded its many heads and reminded us of a wilted *Vernonia*. We hope soon to have some rare material from this rich valley and shall give our botanical friends all the information concerning it we can.—Ed.

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SOME NOTES ON THE FLORA NEAR KALAMAZOO, MICH.—*Nelumbium luteum*, Willd. is found 14 miles south of this place, and this, I believe, is its only station in our state where it flowers. It grows in a mill-pond, and hence must have been introduced after the country was settled. *Nasturtium officinale*, R. Br., from a specimen introduced some years ago, is now choking completely some of our small brooks. We have *Dentaria diphylla*, L., and *D. laciniata*, Muhl., the latter being quite true to its typical form. We find here but one species of *Claytonia*, *C. Virginica*, L. *Sium angustifolium*, L., is abundant. *Vernonia fasciculata*, Mx., is found in the western part of the state, while *Vernonia Noveboracensis*, Willd., takes its place in the eastern half. We have all the species of *Lysimachia*, Tourn., mentioned in Gray's Manual except *L. radicans*, Hook. Our species of *Gerardia*, L., are *purpurea*, L., *flava*, L., and *quercifolia*, Pursh. *Collinsia verna*, Nutt., in our moist woods is one of our loveliest spring flowers. The *Castilleia coccinea*, Spreng., about here is always of the yellow variety. *Polygonum Hartwrightii*, Gray, is found along our new railways where they cross the flats adjoining the river. Where can a description of this species be found? In May, 1873, I discovered a specimen of *Salix discolor*, Muhl., having both male and female flowers in the same catkins. Visiting it when in fruit the seeds seemed quite normal. Is this of common occurrence? *Symplocarpus fœtidus*, Salisb., is our earliest harbinger of spring. While the earth is still locked in winter's frozen embrace, in favored spots this hardy plant pushes up its spathes and opens its flowers. Its leaves are already, Jan. 27, piercing the surface, and I have found its fully opened blossoms on the 15th of February, when sleighs were still in use on our streets. Of Orchids we list *Orchis spectabilis*, L., *Habenaria viridis*, R. Br., var. *bracteata*, Reich., *H. psycodes*, Gray, *Spiranthes cernua*, Richard, *S. gracilis*, Big., *Arethusa bulbosa*, L., *Pogonia verticillata*, Nutt., *Calopogon pulchellus*, R. Br., all the species of *Cypripedium* mentioned by Gray, except *arietinum*, R. Br., and *Aplectrum hyemale*, Nutt. This last is abundant in our beech woods and its green leaves are very noticeable after the snow of winter has gone, but after vegetation has started it is almost impossible to discover its dingy flowers. Our *Trilliums* are *grandiflorum*, Salisb., and *erectum* L., var. *declinatum*, Gray, which passes into *cernuum*, L. *Eriocaulon septangulare*, With., found here seems to be 8-striate.

Among plants whose habitat is chiefly south of this, we have *Asimina triloba*, Dunal, *Solea concolor*, Ging, *Viola pedata*, L., *V. rostrata*, Pursh. (flowering in May), *Mollugo verticillata*, L., *Gleditschia triacanthos*, L., *Œnothera fruticosa*, L., *Chærophyllum procumbens*, Lam., *Nyssa multiflora*, Wang., *Viburnum prunifolium*, L., while the northern *Zygadenus glaucus*, Nutt., *Tofieldia glutinosa*, Willd., and *Hierochloa borealis*, Rœm. & Schultes, are found in low meadows. *Heuchera hispida*, Pursh, grows on dry soil; *Hydrocotyle umbellata*, L., thrives on the shore of a pond; and *Woodwardia Virginica*, Smith, abounds in some of our swamps. *Malva Alcea*, L., and *Sida Napœa*, Cav., have established themselves in one station by the railroad, and *Cenchrus tribuloides*, L., may have been brought by the same agency. *Erodium cicuta-*

All communications addressed to John M. Coulter, Hanover, Ind.

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rium, L'Her., has come sparingly, whether from the east or the west, I know not. A few specimens of *Trifolium procumbens*, L., and one of *Lepidium campestre*, L., have been detected here. *Tragopogon pratensis* also is sometimes spontaneous by our roadsides.—Frank H. Tuthill, *Kalamazoo, Mich.*

In answer to a query contained in the above article we have inserted a translation of Dr. Gray's description of *Polygonum Hartwrightii*.

Polygonum Hartwrightii, Gray (*Proc. Amer. Acad., Dec.* 1870).—Persicaria. Digyna. Strigose-hirsute or smoothish; stem less than a foot high, erect, striate, equally leafy even to the top; leaves broadly lanceolate, acute or obtusish at each end, short-petioled; ochreæ leaf-like to the middle, hypocrateriform, limb foliaceous, reticulate, repand, setose-ciliate; peduncle erect, not glandulose, bearing mostly a solitary, dense, cylindrical spike; bracts surpassing the pedicels, perigonium rose-colored, without glands; stamens 5; style deeply 2 cleft.—Sedgy bogs, New York, from Herkimer to Yates county, and Michigan.

This plant was collected also at Fort Bridger, southwestern Wyoming, in August, 1873, by Prof. Porter.

Some plants common to Plumas County, California, and the Black Hills of Dakota.—In the list of plants collected in the Black Hills during the summer of 1874, I am pleased to observe that sixteen of its species enumerated are found in abundance in our county, viz:

Aconitum nasutum, Fisch.
Lupinus ornatus, Dougl.
Lupinus leucophyllus, Lindl.
Carum Gairdneri, Benth. & Hook.
Erigeron Canadense, L.
Achillea Millefolium, L.
Lophanthus anisatus, Benth.
Gilia pungens, Benth.
Linum perenne, L.
Lupinus parviflorus, Nutt.
Epilobium angustifolium, L.
Galium boreale, L.
Chœnactis Douglasii, Hook. & Arn.
Mimulus luteus, L.
Stachys palustris, L.
Collomia linearis, Nutt.

Mrs. Mary E. Pulsifer Ames, *Taylorsville, Indian Valley, Plumas Co., California, Dec.* 8, 1875.

A new locality for the Yellow-Rattle.—*Rhinanthus Crista-galli*, L., is an abundant plant here. In June its blossoms are quite conspicuous in the meadows bordering the Nangatuck river and occasional specimens may be found upon the hills. The only localities in the United States hitherto recorded are a small patch discovered by Professor Tuckerman in the "subalpine district" of Mt. Washington, N. H., and the meadows of Plymouth, Mass., where it was found by Dr. Bigelow. Messrs. Hall and Harbour also found it in the Rocky Mountains of Colorado Territory in 1862. It occurs upon the north shore of Lake Superior, according to Professor Agassiz, and "in fields and meadows," Lower Canada, according to Pursh, and probably it is common northward. Now that Hermann Müller has shown the plant has not the characters of an alpine species, it must be regarded as a straggler in its position upon Mt. Washington, and its occurrence in Waterbury renders it probable that the plant is (contrary to Professor Gray's supposition) indigenous at its Plymouth locality.—W. H. Patton, *Waterbury, Conn.*

Some Great Ragweeds.—In the river bottom below the village of Hanover, is a ravine of about twenty rods in length by four or five in breadth, frequently flooded by the backwater in freshets, which seems to have taken advantage of its exposure to the sun and its facilities for the enrichment of its soil, to achieve something extraordinary in the way of vegetation. To make sure of its end it has entered into an alliance offensive and defensive with *Ambrosia trifida*, L., the Great Ragweed. The Ragweeds have sole and full possession, and so thickly do they send up their trunks and so loftily do they rear their heads that no other herb can get either sun or soil on their territory. Several years ago, with a companion, I made a reconnoissance among them and found them averaging from twelve to eigh-

teen feet in height. Two specimens of the latter altitude my companion and myself secured, and, having duly measured, deposited in the college cabinet as samples of what that ravine can do in Ragweeds.—Prof. W. N. Geddes, *Hanover, Ind.*

The Numerical Relations existing among the Forest Trees of Jefferson Co., Ind.—In a region with a flora so diverse as is met in Southern Indiana, we would naturally expect to find striking differences in the proportions which the forest trees bear to each other in different localities; nor are we disappointed in this in Jefferson County. From the proximity to the river and consequent ease of transportation, large numbers of valuable trees have been shipped, so that in the forests nearest the Ohio there is a striking lack of valuable timber and an almost total absence of the Black Walnut (*Juglans nigra*, L.). The numerous stumps of this last, however, give evidence of its former abundance. Along the southern slopes of the county and back some two or three miles on the hills the Beech (*Fagus ferruginea*, Ait.) is by far the most abundant, filling forest after forest almost exclusively. In this southern section it constitutes nearly 70 per cent. of the entire number of trees found. Farther north in the county the Oaks come into prominent notice in their numerous species, in the central strip of the county constituting fully 40 per cent. of all the trees. Still farther north we have the different genera more equally distributed, none having any special predominance. In my notes of 1873, I find the following table, based on a thorough observation of the forests of the county.

Fagus ferruginea, Ait. (American Beech.)	35 per cent.
Querci. (Oaks.)	18 " "
Liriodendron Tulipifera, L. (Tulip-Tree.)	10 " "
Acer rubrum, L. (Red Maple.) *Acer saccarhinum*, Wang. (Sugar Maple.)	5 " "
Fraxinus Americana, L. (White Ash.) *Fraxinus quadrangulata*, Mx. (Blue Ash.)	5 " "
Juglans nigra, L. (Black Walnut.)	5 " "
Carya alba, Nutt. (Shell-bark Hickory.)	5 " "
Platanus occidentalis, L. (Sycamore.)	3 " "
Æsculus glabra, Willd. (Ohio Buckeye.) *Æsculus flava*, Ait. (Sweet Buckeye.)	2 " "
Ulmus Americana, Willd. (White Elm.)	2 " "
Other species,	10 " "
	100

In this calculation many of the less prominent trees were omitted. Had they been included the results reached would doubtless have been considerably modified. The total disregard for the preservation of our forests, which seems to characterize the modern land owner, may have materially changed these results even in the brief time that has elapsed since my notes were made. In concluding, allow me to ask botanists in other localities to furnish me, through the Bulletin, their observations on this subject of numerical relations.—M. S. Coulter, *Logansport, Ind.*

Some early Plants.—On January 25th, accompanied by a friend, I made a search through our ravines to find what effect the warm weather was having on vegetation. *Capsella Bursa-pastoris*, *Stellaria pubera* and *S. media* were found in vigorous growth and full bloom, the last species covering the ground with its bright green mats. *Corydalis flava* and *Sedum ternatum* were well up and in bud. *Viola cucullata* had fully matured leaves, *Arabis lævigata* was two or three inches high and *Stylophorum diphyllum* was well started. *Peziza coccinea* was beautifying the ground with its cluster of scarlet lined cups. *Lepidium Virginicum* was in full bloom on Jan. 1st, and many of those mentioned above were in bud at that time. M. S. Coulter, writing from Logansport, in the northern part of the State, says, "on the 28th of Jan., I struck our promiscuous friend, *Capsella*, in full bloom, and *Stellaria pubera* so nearly out that it is certainly in full bloom to-day."—Ed.

The Botanical Contribution by Dr. Gray, issued January 5th, 1876, is remarkably rich in new material. It contains the descriptions of 50 new species and 4 new genera, besides the revision of several genera. The indefatigable Dr. Edward Palmer has been collecting in Lower California and on Guadalupe Island off Lower California and has brought in a rich harvest. Twenty-two new species and three new genera prove his zeal and success. The new genera proposed are *Palmerella* of the *Lobeliaceæ*, *Hesperelæa* of the *Oleaceæ* and *Harpagonella* of the *Borraginaceæ*. Another new genus of the *Borraginaceæ* is described, called *Echidiocarya*. T. S. Brandegee, of Hayden's Exploration of 1875. has added five new species to the flora of Colorado, and other parties three more, making an addition of eight new species. Dr. Gray has also given us in this contribution a revision of American *Specularieæ*. Also a revision of the genus *Collinsia* in North America, making eleven species; a revision of North American *Mimuli*, making twenty-nine species, and a revision of the genus *Monardella*, with eleven species. Altogether, the contribution is one of unusual interest and a valuable addition to western botany.

We have received a circular from Prof. Herbert E. Copeland, of Indianapolis, Ind., announcing a "Summer School of Science and Physical Culture." The route chosen is a most tempting one to botanists, and it is doubtful whether any other route of similar extent could be selected which would present so rich and varied a flora. The school leaves Indianapolis July 11th, goes by way of Mammoth Cave to Lookout Mountain where it disbands August 22d. Prof. Copeland will have the Botany of the Expedition in charge and will communicate to the BULLETIN any notes of interest.

BOOKS AND PAMPHLETS RECEIVED.—*Exploration of the Colorado River of the West and its Tributaries.* Explored in 1869, 1870, 1871, and 1872, under the Direction of the Smithsonian Institution. By J. W. Powell. Washington, D. C., 1875.

Report of a Reconnoissance of the Black Hills of Dakota, made in the Summer of 1874. By William Ludlow, Capt. of Engineers. Washington, D. C., 1875.

Report of the Geological Survey of the State of Missouri, including Field Work of 1873-1874, with 91 Illustrations and an Atlas. Garland C. Broadhead, State Geologist. Jefferson City, Mo., 1874.

Botanical Contributions. By Asa Gray. Extracted from the Proceedings of the American Academy of Arts and Sciences, Vol. XI. January 5, 1876.

Catalogue of the Plants of Ohio, including Flowering Plants, Ferns, Mosses and Liverworts. By H. C. Beardslee. Painesville, Ohio, January, 1874.

Bulletin of the Torrey Botanical Club, New York, December, 1875.

The Black Spruce. By Charles H. Peck, A. M. Read before the Albany Institute, May 4, 1875.

The Nelumbium Luteum or Great American Water Lily. Its Value as an Ornament to the Public Parks of Chicago. By E. M. Hale, M. D. Chicago, Ill., 1871.

Notes on the Big Woods. By Prof. N. H. Winchell. Extracted from the Annual Report of the State Horticultural Society for 1875. Minnesota.

Bulletin of the United States National Museum. No. 1.—Check-List of North American Batrachia and Reptilia. By Edward D. Cope. Washington, D. C., 1875.

Bulletin of the United States National Museum. No. 2.—Contributions to the Natural History of Kerguelen Island. By J. H. Kidder, M. D. Washington, D. C., 1875.

Bulletin of the United States Geological and Geographical Survey of the Territories. Bulletin, No. 5.—Second Series. Washington, D. C., January 8, 1876.

The Scientific Monthly. A Magazine Devoted to the Natural Sciences. Vol. I., No. 3. December, 1875. E. H. Fitch, Editor and Proprietor. Toledo, Ohio. $3.00 a year.

Bulletin of the United States Geological and Geographical Survey of the Territories. Bulletin, No. 6.—Second Series. Washington, D. C., February 8, 1876.

Botanical Bulletin.

Vol. 1. MARCH, 1876. *No. 5.*

"Chia."—During the past summer my attention was called, whilst in Southern California, to a mealy preparation in popular use among the Indians, Mexicans and prospectors. On inquiry I found it was called "*Chia.*" Further examination proved that it was furnished by the seeds of *Salvia columbariæ*, Benth. The seeds are collected, roasted, and ground, in the native way, between two stones. This puts it in the condition in which I first saw it. It is used as a food by mixing it with water and enough sugar to suit the taste. It soon developes into a copious mucilaginous mass, several times the original bulk. The taste is somewhat suggestive of linseed meal. One soon acquires a fondness for it and eats it rather in the way of a luxury than with any reference to the fact that it is exceedingly nutritious besides. It is in great demand among the knowing ones who have a desert to cross, or who expect to encounter a scarcity of water, and what there is, of bad quality. By preparing it so thin that it can be used as a drink, it seems to assuage thirst, to improve the taste of the water and, in addition, to lessen the quantity of water taken, which in hot countries is often so excessive as to produce serious illness. As a remedy it is invaluable from its demulcent properties, in cases of gastro-intestinal disorders. It also holds a place among domestic remedies, for the same purpose that flaxseed occasionally does with us, i. e., a grain of the seed is placed in the eye (where it gives no pain) to form a mucilage by means of which a foreign body may be removed from the organ. I have found it of great service as a poultice. As a matter of archæological interest it may be noted that quantities of this seed were found buried in graves several hundred years old. This proves that the use of the seed reaches back into the remote past. Indeed I find several allusions to the name Chia in the second volume of Bancroft's great work on the *Native Races of the Pacific States*, pp. 232, 280, 347, 360. *Chianpinoli* appears to have been made by the so-called Aztec races from corn which was roasted and ground as the Chia was. From this, however, I conclude that the term Chia was then a generic name applied to meal derived from several sources. At present the name is almost restricted to the product of *Salvia columbariæ*. Chia was among the Nahua races of Ancient Mexico as regularly cultivated as corn, and often used in connection with it. I would state that my attention was first called to it by Mr. Kennedy, of Fort Tejon, California, a gentleman whose long and varied experience in that region makes him good authority upon all its products.—Dr. J. T. Rothrock, *Wilkesbarre, Pa.*

The new Aphrodisiac, Anti-rheumatic, etc., over which a few doctors are going into ecstasy, and by which certain drug venders hope to realize a small fortune, turns out to be an old, well known plant. Of course, *for business reasons*, it is best that the name and affinities of the herb should remain as obscure as possible. However, it is none the less *Bigelovia veneta*, Gray (Proc. Amer. Acad. Vol. VIII, p. 638). As older names we may quote also *Baccharis veneta*, H. B. K., *Aplopappus (Aplodiscus) discoideus*, DC. (Prodr. 5, p. 350.). Whatever virtues it may have are

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likely to be shared by some near relatives, especially by such as *Bigelovia Menziesii*, Gray. The suspicion rises that ere long it will be consigned to limbo with Condurango *et id genus omne*.—Dr. J. T Rothrock.

A valuable work.—I do not wish to be understood as acting in the interest of the booksellers, but for the benefit of botanists who may otherwise fail to obtain a valuable work at a very low rate, I will say that Sidney S. Rider, Bookseller, Providence, Rhode Island, has for sale at nine dollars per copy:—*A General System of Botany, Descriptive and Analytical*, by Le Maout and Decaisne, translated by Mrs. Hooker. The orders are arranged by J. D. Hooker. The copies are new and perfect, and formerly sold for twenty-five dollars. But few remain on hand.—Dr. J. T. Rothrock.

Notes upon some Graminee.—This group of plants seems well represented in Jefferson County, Indiana, as the following account of a portion of a season's collection will show. We have no doubt that the researches of a whole season by one thoroughly enlisted in this department of Botany would add many species to our list, especially the smaller species and those less general in distribution. The county presents such a diversity of soil and surface as to warrant us in the expectation of equally diverse plant life, and when to this we add its border line of climate and its extremes of heat and cold, we will find another reason for the presence or looked for presence of species naturally of more northern or southern habitat. Along our creeks, in considerable abundance, flourishes *Leerzia oryzoides*, Swz., while every damp, open timber land is the home of the long wiry culms of *L. Virginica*, Willd. *Phleum pratense*, L., is our best hay making grass and economically of much importance, but it seems to be rather easily run out by the Red and White Clovers, or the more strongly rooting *Agrostis vulgaris*, With. For a short time its quality and purity remain excellent, but in the long run both it and the Clovers fall under the steady encroachments of the Red-top. *Vilfa vaginæflora*, Torr., grows plentifully in the clayey soil of the upper portion of the Ohio River bluffs. Its dry and scarious appearance after a season of remarkable moisture, would lead us to think that here it can be of little value as a food stuff for our cattle, but being a tenant of very poor soil, where nothing else seems to take hold, it asserts its usefulness. We suppose that we have found *V. Virginica*, Beauv., in many of the open commons. *Agrostis perennans*, Tuck., appears in fruit late in the fall along the water courses of the richer woodlands. *A. vulgaris*, With., is our most common meadow grass, seeming to find in the soil here those conditions that afford the readiest support. It may be said to be the essential grass of our meadows, and the dependence of the farmer. *A. alba*, L., is found sparingly along the grassy borders of small streams. *Cinna arundinacea*, L., grows quite sparingly in our open woods and occasionally straggles into the damper portions of a few meadows. Of the genus *Muhlenbergia* we have found five species, viz., *M. sobolifera*, Trin., *M. Mexicana*, Trin., *M. sylvatica*, T. & G., *M. Wildenovii*, Trin., and *M. diffusa*, Schreber. The first, *M. sobolifera*, is common in the open hilly woods running back from the Ohio River, while *M. Mexicana* generally appears in all cultivated ground. *M. sylvatica* and *M. Wildenovii* are found in small patches in most hilly and slightly timbered woodlands, while *M. diffusa* attains its greatest luxuriance in our very door yards, often making a dense matting by the interweaving of its numerous branches. *Brachyelytrum aristatum*, Beauv., is almost confined to a few damp woods. In nearly every sandy field may be found an abundance of *Aristida gracilis*, Ell., with here and there an intermingling bunch of *A. dichotoma*, Michx. *A. ramosissima*, Engelm., is very limited in its distribution, but in a few old sandy commons it occurs quite abundantly. Another intruder in our door yards and not a stranger to the public roads is *Eleusine Indica*, Gærtn. *Tricuspis sesleroides*, Torr., is rare, having been found in but a few patches along the Ohio. We would again call attention to a grass already mentioned in the Bulletin, viz., *Diarrhena Americana*, Beauv., which, while limited in its distribution, is a little re-

markable in the profusion of its growth. The writer happened upon a most luxuriant patch of not less than one-fifth of an acre during one of his summer excursions. *Dactylis glomerata*, L., is occasionally met with about the edges of old fields. *Eatonia Pennsylvanica*, Gray, is quite local to a few damp places in the neighborhood of running water. *Glyceria nervata*, Trin., is common along most of the smaller rivulets of the meadows, while in a single mucky swamp we gathered a few specimens of *G. fluitans*, R. Br. *Poa compressa*, L., with its wiry stems is scattered everywhere, but always in quite small quantities. *Eragrostis reptans*, Nees., is pretty common in all of our wet timber and often becomes remarkable for its size, leading one from a superficial examination to regard it *E. pilosa*, Beauv., or *E. Purshii*, Schr. In the dry sandy fields, however, and along the Ohio we meet the more typical forms of this species. *E. poæoides*, Beauv., var. *megastachya* is abundant in cultivated grounds and also occurs along roads. We have met several specimens in which many spikelets of this variety contain but 1–3 flowers. *E. pilosa*, Beauv., is not uncommon about the river bank during September and October, and it also presents some variations from the typical forms. *E. Frankii*, Meyer, is found sparingly along the highways and also in a few old fields from July to October. *E. Purshii*, Schred., abounds along most of the public roads and also to some extent in grainfields and open pastures. *Festuca nutans*, Willd., is occasionally met with along a few of the smaller water courses of sparsely timbered land. In a few old grain fields we find, here and there, *Bromus secalinus*, L., but it is rare. *B. ciliatus*, L., seems to grow pretty generally in our richer woods, but about the base of the cliff rocks of the Ohio and in similar places along the larger creeks it seems to thrive most vigorously. *Uniola latifolia*, Michx., is quite a rare grass, a few little patches seeming to find congenial spots on a damp hillside of the Ohio. Along the rich shady banks of a few little brooks we have observed sparing growths of *Elymus Virginicus*, L., and also *E. Canadensis*, L. *E. striatus*, Willd., is common in all rocky woods and also along some of the larger creeks. *Gymnostichum Hystrix*, Schreb., grows upon all the bluff rocks of the Ohio and also pretty generally about the cliffs of certain creeks. *Danthonia spicata*, Beauv., is a plentiful grass in most woodlands. *Paspalum setaceum*, Michx., is common in old meadows and also in newly cleared timber lands. *P. læve*, Michx., we gathered in considerable abundance in a few damp meadows and observed it about the low banks of several water courses from July to October. *Panicum glabrum*, Gaudin., is more or less abundant from August to October in all the flat moist woods. *P. sanguinale*, L., is no small annoyance in our gardens, also being hardly less plentiful in many fields. *P. anceps*, Michx., and *P. agrostoides*, Spreng., we collected during August and September having found both species abundant in the wet and clayey meadows. *P. capillare*, L., seems scattered everywhere. Some depauperate forms of this species gathered in the woods seemed to lack entirely the common hairy character. On the banks of the Ohio we gathered a few specimens of *P. virgatum*, L. We have collected a few representatives of *P. latifolium*, L., in the fence rows, while in the more open woods we have gathered a large fruited and quite hairy depauperate form. *P. clandestinum*, L., is not uncommon in dense matted tufts along the banks of some of the smaller creeks. *P. microcarpon*, Muhl., we found quite plentifully during July and October in some of the poorer meadows and fence rows. *P. dichotomum*, L., and *P. depauperatum*, Muhl., are widely scattered and present many variations in appearance. They fruit from early in the summer until late in the autumn. *P. Crus-galli*, L., infests most cultivated grounds and we have met specimens which were over five feet high. *Setaria glauca*, Beauv., has appeared this year in unusual quantities throughout the county. As a grass of very poor quality for feeding purposes its appearance has been much deprecated by farmers. Now whether its abundance is due to a lighter growth of the other meadow grasses, thus failing to choke it down, or to a very wet season, I don't feel able to say. I would hear with pleasure of the observations of any others upon this point. *S. Italica*, Kunth., is cultivated to a small extent and is

also slowly finding a lodgment outside of cultivation. Late in October we happened upon a few bunches of *Andropogon furcatus*, Muhl., which leads us to think it rare here. However, if *A. furcatus* is rare *A. Virginicus*, L., is much more abundant than is desirable, being common everywhere. In fact, it and *Erigeron annuum*, Pers., are the enemies of our meadows, as both greatly spoil the quality of the hay. The only way by which the farmer can rid himself of them seems to be to turn up his meadow with his plow, a method frequently resorted to here.—A. H. YOUNG, *Hanover, Ind.*

UROMYCES LESPEDEZÆ, (Schw.)—Many botanists may have noticed the little fungus that grows so plentifully on the under surface of the leaves of *Lespedeza violacea*, Pers. I sent some of the fungus-covered leaves to Chas. H. Peck, Esq., of Albany, N. Y., and I think his answer may be of interest to other botanists. "The fungus you send on the leaves of *Lespedeza violacea* was first described by Schweinitz, in his *Syn. Fung. Car., No.* 498, under the name *Puccinia Lespedezæ-polystachiæ*, but afterwards finding the fungus more abundant on *Lespedeza violacea* than on *L. polystachia*, he changed its name in his *Syn. N. A. Fungi, Trans. Am. Philos. Soc., New Series, Vol. IV, p.* 296, to *Puccinia Lespedezæ-violaceæ*. It does not belong to the genus *Puccinia* as now understood, but to the genus *Uromyces* and the name has generally been written *Uromyces Lespedezæ-violaceæ*, Schw., but inasmuch as this name is objectionable both because of its compound character and because of its implied limitation of the habitat of the fungus, which occurs on the leaves of *all* our species of *Lespedeza*, it seems to be best to make still another change and write *Uromyces Lespedezæ*, (Schw.) as the name of this fungus. Each black dot on the leaf is made up of a vast number of simple, ovate, pedicellate spores, densely crowded together." Mr. Peck also sent a sketch of a few of these spores magnified about 400 diameters and colored as they appear under the microscope when viewed by transmitted light, which I would like to show by a cut but am unable at present.—ED.

AN OLD FRIEND PUT TO NEW USES.—The following item seems to be going the rounds of the newspapers, and if true, adds a new interest to a very familiar friend: "The Western Tannin Plant, *Polygonum amphibium*, L., which grows luxuriantly in the Missouri River Valley, seems destined to replace oak bark in tanning. It contains 18 per cent. of Tannin, while the best bark contains but 12 per cent., and large establishments employing it in Chicago, find that one-third more leather can be obtained with it than with a like quantity of bark. The process of tanning with it is identical with that with bark, but the leather is tougher, finer, and more durable, and receives a finer finish. The plant is an annual and can be mowed, dried, and stacked like hay." If these are facts *Polygonum amphibium* is destined to become an important product in some sections of our country.—ED.

AN interesting contribution to Ohio botany has been received from Dr. H. C. Beardslee, of Painesville, Ohio. It will be published in part, if not altogether, in the next number of the BULLETIN. It is a list of the *Hepaticæ* growing in Ohio, numbering some 68 species and based upon Austin's *Hepat. Bor. Amer.*

Contributions of notes are desired from all botanists, and such notes as are accepted will appear in the *number of the Bulletin issued immediately after their receipt*, as it is not intended to limit the size of the paper to four pages if the amount of matter will justify an enlargement.

Botanical Bulletin.

Vol. 1. APRIL, 1876. *No. 6.*

How to apply pressure in making botanical specimens.—The use of "large stones, especially if roped round to give easy hold, or a few strong boxes filled with sand leave nothing to be desired"—by fine young fellows who delight in working off their superfluous energies; but for those of us who have reached the "shady side of forty" with no such surplus vitality to spare, the substitution of some mechanical device which will obviate the laborious lifting of heavy weights, becomes desirable. Simple screw presses are objectionable, especially in the hands of beginners. "The pressure is deceptive and apt to be far too great at first, yet from the nature of the instrument does not follow the contraction of the pile as its moisture escapes." (Mac Owan.) In order to hit that happy medium *between press and squeeze*, essential to the preparation of a first rate specimen we must *know how much pressure* we are applying and it must be increased (at any rate not diminished) as the plant dries. We have had in satisfactory use for several seasons, a press so constructed that the platform which supports the pile of driers will yield under just the amount of pressure which we wish to give, thus precluding the possibility of excessive pressure and at the same time obviating all the objections to the use of a screw. The simplest arrangement for this purpose is that of a beam resting upon a fulcrum with the platform at one end and the necessary weight at the other. A screw is fixed several feet above the platform. In using place your pile of driers and plants on the platform and apply pressure with the screw until you sink the platform two or three inches. You thus *measure your pressure for it can not be greater than the counterpoise*, and what is of more importance as your pile contracts the platform will *follow it up* with a uniform pressure. Specimens recently gathered will be conveniently placed on the top where they will receive the pressure of the counterpoise, *minus the weight of the pile of driers* and afterwards towards the bottom where the pressure is greater. Non-essential contrivances for carrying out the plan must be left to the ingenuity of any person constructing such a press. Of course it is only the industrious collector at a permanent station who will want anything of the kind. Where only a few hundred specimens are to be made during the summer, stones will answer every purpose.—M. S. B.

Some Indianapolis notes.—We have anticipated spring by a week of Maple blossoms, and *Cardamine rhomboidea*, var. *purpurea*, in full flower on the 24th ult. The Silver-Maples have, however, been crazy for a month and been frozen several times for their temerity. The White Poplars hung out their "caterpillars," as John Burroughs aptly calls them, to the wind last week and are sorry for it to-night, I warrant. The robins, blue-birds, meadow-larks and red-wings have set their noses northward with force enough to stop a glacier, and so doubtless we may expect to play before many weeks.

I notice that a contributor to Forest and Stream, Wm. Seaman, speaks of *Anacharis Canadensis*, Planchon, as decaying readily in the aquarium and thus in two instances killing the fishes. After six months experience with it I rise to its defense. A more satisfactory plant I never hope to have. By clipping the main stem, the lateral shoots thrive, take root and our only complaint of it is that it

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grows so vigorously that we are called upon every few weeks to destroy many fine plants. I prefer it to any plant I know for under water growth.—Hebert E. Copeland, *February 28th.*

List of Hepaticæ growing in Ohio.—

Sarcoscyphus sphacelatus, Nees.
Plagiochila macrostoma, Sullivant.
" *porelloides*. Lindenberg.
" " var. No. 7b, Aust. Hepat.
" *asplenoides*, N. & M.
Scapania nemorosa, var. 1. Nees. Aust. Hep. No. 16.
" " var. 3. Sull. Muse. Allegh. No. 226.
" *albicans*, Mitten., var. *taxifolia* Minor, Aust. Hep. No. 23.
Jungermannia hyalina, Lyell.
" *crenulata*, Smith.
" *crenuliformis*, Austin.
" *excisa*, Dickson.
Cephalozia Sullivanti, Aust., Hep. p. 13.
" *catenulata*, Huben.
" *connivens*, Dickson.
" *curvifolia*, Dickson.
Odontoschisma Sphagni, Dicks. (Dum.)
" *Hubeneriana*, Rabenhorst.
" *scutata*, (Web.) Austin.
Liochlæna lanceolata, Nees.
Lophocolea heterophylla, Nees.
" *minor*, Nees.
" *Macouni*, Austin, Hep. p. 17.
Chiloscyphus polyanthos, Corda.
" " var. *rivularis*, Synop. Hep. p. 188.
" *ascendens*, Hook. & Wils.
Geocalyx graveolens, Nees.
Calypogeia Trichomanis, Corda.
Lepidozia reptans, Nees.
Mastigobryum trilobatum, Nees.
" " var. 1. Aust. Hep. No. 78.
Trichocolea Tomentella, Nees.
Blepharozia ciliaris, Dumort.
Blepharostoma trichophyllum, Dumort.
Radula complanata, Dumort.
" " var. *minor*, Aust. Hep. No. 86.
" *obconica*, Sullivant.
Madotheca platyphylla, Dumort.
" " var. *navicularis*, Nees. Aust. Hep. No. 90.
" *rivularis*, Nees.
" *Porella*, Nees.
Phragmicoma clypeata, Sull. Muse. Allegh. No. 271.
Lejeunia cavifolia, Lind.
" *echinata*, Taylor.
Frullania squarrosa, Nees.
" *œolotis*, Nees.
" *Eboracensis*. Gottsche.
Steetzia Lyellii, Lehm.
Pellia epiphylla, Nees.
Blasia pusilla, Linn.
Aneura pinguis, Dumort.
" *sessilis*, Sprengel.
" *palmata*, Nees.
Metzgeria furcata, Nees.
Anthoceros punctatus, Linn.
" *lævis*, var. *minor*, Austin.
Notothylas melanospora, Sull.
" *valvata*, Sull.
Lunularia vulgaris.
Marchantia polymorpha, Linn.
Conocephalus conicus, Dumort.
Asterella hemisphærica, Beauv.
Fimbriaria tenella, Nees.
Riccia natans, var. *terrestris*, Aust.
" *lutescens*, Schwein.
" *fluitans*, Linn.
" " var. *terrestris*, Aust.
" *Frostii*, Austin in Bull. Torr. Bot. Club., detected in Painesville in 1874, in Rocky Mts. in 1873.—Dr. H. C. Beardslee, *Painesville, O.*

Ferns near Hanover, Ind.—While classifying my botanical collections of the last season I was pleased to find so many ferns among them, and as the Cryptogamic Botany of Southern Indiana has received but little notice as yet, we have thought to interest the readers of the Bulletin by making a few notes in this department. Early in July while rambling among some of the limestone cliff rocks of the Ohio River, we secured our first specimens of *Asplenium Ruta-muraria*, L., in beautiful fruit; and since then we have visited the same region every month in order to confirm our observations as to its being an evergreen, and we are now fully convinced of the accuracy of our former remarks upon this point. Associated with this species and fruiting abundantly at the same time, we found quite a growth of *Woodsia obtusa*, Torr., but by the end of August it had entirely withered

away. Its fruiting season begins here probably early in June. *Adiantum pedatum*, L., also appears in fruit early in July and continues on into the fall. It is quite common on the shaded parts of the river hills and at a height of about 175 to 200 feet. We have also observed its occurrence in some of the rich thickets. This apparent growth within a certain range of height is quite marked here in at least another species, *Pellæa atropurpurea*, Link., which occurs all along the river cliffs and with a few straggling exceptions which are the result of the disintegration of the upper rocks, is confined to a range on the topmost rocks little, if at all, exceeding 30 feet in vertical height. Of the genus *Asplenium* we will simply mention the species *A. angustifolium*, Mx., *A. thelypteroides*, Mx., and *A. Filix-fœmina*, Bernh., which were mentioned at some length in a previous number of the BULLETIN. *Camptosorus rhizophyllus*, Link., is abundant upon most of our shaded and moss-covered rocks, both in the neighborhood of the river and along the banks of our larger creeks. Its luxuriance is a marked feature of the broken rocks in the valleys running into the Ohio. We have noticed some striking variations in the character of the basal lobes of the frond, in one of which these lobes are prolonged out from the rhachis on each side from an inch to an inch and a half into a long linear tip. *Phegopteris hexagonoptera*, Fee, appears sparingly, during late summer and fall, in the richer and rolling woodlands and generally along the banks of small streams.—(*To be continued in May number.*)

SOME ALPINE PLANTS FOUND ON MT. LINCOLN, COLORADO.—A botanist who has never ascended a mountain peak in midsummer and seen its wonderfully rich and varied flora, has a treat before him which others may well envy. A word description falls so far short of the reality that it does not seem to convey any correct idea of the beauty and brilliancy of alpine flowers. They are found growing in profusion on most mountain heights, covering with beauty the grassy slopes on the rocky declivities from timber-line to the very summit. Nothing on the plains can approach in rich and delicate beauty these children of the mountain tops, chilled every night to freezing and drawing their nourishment from the just melted snow. The writer was never more delighted with an alpine flora than when he made an ascent of Mt. Lincoln, in Colorado, a peak considerably over 14,000 feet in height. The ascent was made on July 9th, 1873, a highly favorable time to see mountain plants in all their glory. Late the evening before we had encamped at timberline, which is, in Colorado, from 11,000 to 12,000 feet elevation. This timberline is determined by the lying of the snow in spring. Of course the highest tree growth is evergreens, which are curiously knotted and twisted by the weight of the winter snow. Early we commenced the climb and every step in advance brought us to new beauties, and long before the summit was reached our portfolios were groaning with treasures which neither love nor money nor fatigue could have induced us to throw away. Time or space will not permit me to enumerate half the plants I secured that day, but I will mention a few of the most prominent.

We had not gone ten yards from camp when we found ourselves amongst thick clumps of *Pentstemon glaucus*, Grah., with its dense clusters of very dark purple flowers. Near by were growing the two *Polygonaceæ* always found in the Rocky Mountains, *Polygonum Bistorta*, L., var. *oblongifolium*, Meis., bearing its large dense spike of white flowers, and *Oxyria digyna*, Campd. We also secured three or four specimens of the delicate little *Adoxa Moschatellina*. L., exhaling its faint musky odor. All along the slopes were growing the blue *Mertensia alpina*, Don., and the darker blue *Polemonium confertum*. Gr. with its crowded and musk-scented clusters of flowers. The *Anemones* were out in profusion of numbers and species, flashing at us everywhere with their large and various colored flowers. There were *Anemone patens*, L., var. *Nuttalliana*, Gr., *A. parviflora*, Mx., *A. multifida*, DC., by far the most common and brilliant, and the rarer *A. narcissiflora*. L., with its solitary white flower. *Thalictrum Fendleri*, Eng., was also growing in great profusion along with *Ranunculus adoneus*, Gr., the most showy species of the genus. Its

flowers are solitary, golden yellow and often an inch in diameter. Any one traveling and camping in the mountains will soon become acquainted with *Caltha leptosepala*, DC., as it is a most excellent pot-herb and many a case full have I carried in to camp to be used at our next meal. Its flowers are large and beautiful but always look as if they were about chilled to death. There is always a tinge of blue, especially on the underside of the white petals. *Trollius laxus*, Salisb. is always associated with the last, but its flowers are various shades of yellow and look more in keeping with the frosty air. The *Drabas* are also well represented. There are the yellow flowered *Draba alpina*, L., *D. aurea*, Vahl. and *D. streptocarpa*, Gr., with its curiously twisted silicles. The white flowered *D. nemorosa*, L., var. *alpina*, Porter, occurs quite abundantly at 12-13000 feet elevation. The little golden flowered *Cymopterus alpinus*, Gr., is found growing every where on the mountain tops. Two beautiful little *Erigerons* were found growing at 13000 feet altitude; *E. compositum*, Pursh., having a scape 2-6 inches high and rays white, pink or blue, and *E. uniflorum*, L., growing 3-6 inches high, its large solitary head surrounded by a very woolly involucre, the wool generally being deep purple. At about 13000 feet elevation we came across a patch of flowers I never shall forget. It was a level, grassy spot, saturated with the just melted snow-water and well protected from chilling blasts. The ground was absolutely covered with brilliant bloom and it seemed as if every color in the rainbow was represented. Never have I seen, in the best kept gardens, such a rich display. There was a sparkling freshness and freedom about it we never can get into green houses. The first to attract my notice, because the largest, was the showy *Primula Parryi*, Gr., having its dense cluster of fleshy root leaves and bearing on its long scape a cluster of rose-colored flowers. Close to it was its more humble relative, *P. angustifolia*, Torr., a most exquisite little *Primula*, bearing a single purple flower and running up the mountains to 14000 feet. Then I noticed the flowers that contributed the yellow to the scene. First and foremost was the splendid *Actinella grandiflora*, T. & G. with a scape 6-9 inches high and densely white woolly from top to bottom. Its large solitary heads seemed half as large as the whole plant and were frequently three inches broad. Then there was its smaller relative, *A. aculis*, L., with a naked scape 1-6 inches high and smaller flowers. Then there were two *Sedums* giving shades of purple, rose and white. They were *S. Rhodiola*, DC., with its dark purple fertile heads and greenish sterile heads and *S. rhodanthum*, Gr., bearing rose-colored or white flowers. Then there was *Geum Rossii*, Seringe, with golden yellow petals and the little rose-colored *Calandrinia pygmæa*, Gr., which also runs far up the mountains. Then I noticed three species of *Saxifraga*, viz: *S. cernua*, L., with small white or cream-colored flowers and bearing little bulbs in the axils of its upper leaves; *S. flagellaris*, Willd., with large yellow flowers and stolons striking out in every direction from its cluster of root leaves; and *S. punctata*, L., with white petals and a tall naked scape. Then high up on the mountain, at 14000 feet altitude, came the little moss-tufted flowers, crouching down close to the ground to escape as much as possible the freezing winds, but brilliant nevertheless. There was the purple-flowered *Silene acaulis*, L., or Moss Campion, familiar to visitors in the White Mountains. It clung to these high slopes in large bunches and made great mats of purple. We saw also two *Claytonias*, viz: *C. Caroliniana*, Mx., var. *lanceolata*, Watson, and *C. arctica*, Adams, var. *megarhiza*, Gr. with its great purple tap root running deep into the rocks and its scape bearing delicate white flowers penciled with pink lines. No less than four *Trifoliums* lent their beauty to these great heights. They were *T. longipes*, Nutt., the beautiful little dark purple, half opened *T. nanum*, Torr., the delicately shaded *T. dasyphyllum*, T. & G., and the large headed, rose purple *T. Parryi*, Gr. No flower was prettier than the densely matted, violet blue *Oxytropis Uralensis*, L., var. *pumila*, Ledeb. The sky blue shade was given by dense patches of *Eritrichium villosum*, DC., var. *aretioides*, Hook., which is called the mountain Forget-me-not. These flowers are to be met upon almost all the mountains in Colorado and well repay the fatigue of climbing.—Ed.

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NOTES ON A STACHYS FROM SOUTHWESTERN VIRGINIA.—"*Stachys palustris*, L., var. *cordata*. Gray (*S. cordata*, Riddell, 1836. *S. Nuttallii*, Shuttlew., 1848.).—Stem beset with spreading or reflexed bristly hairs; leaves hairy or smoothish, *oblong, heart-shaped at the narrowed base*, all more or less petioled; calyx-teeth sometimes shorter.—Common southward and westward." *Gray's Man., 5th ed. p.* 358.

"*Stachys Nuttallii*, Shuttlew.—Perennial, erect, hispid with rigid, spreading or somewhat reflexed hairs; leaves petioled, *oval-elliptic* or *suboblong, narrowed toward the base*, cordate, long-pilose on both sides; floral ones bract form, scarcely surpassing the calyxes; teeth of the campanulate, pubescent calyx short, mucronate-acute; tube of the corolla much exserted. From the mountains of Tennessee (Ruegel!) to Ohio (h. Hook.!). *S. sylvatica*. Nutt. Allied to *S. sylvatica*, but the leaves much narrower at base. Calyx in flower scarcely 2 lines; tube of the corolla almost 4 lines long." *DC. Prod.* 12., *p.* 468.

Dr. Riddell's plant I have not seen and have no access to his description.

A *Stachys* collected near Wytheville, S. W. Va., and represented by a goodly number of specimens received from my indefatigable friend, Mr. Howard Shriver, seems to belong to the foregoing variety or species, but does not accord in all respects, as will appear from the following notes:

Leaves ample, *broadly ovate* or somewhat *oblong-ovate*, more or less acuminate, *rarely* narrowed toward the cordate base, coarsely and unequally crenate, sparsely covered on both sides with bristly hairs, *on long petioles.*

Measurements of the leaves taken from 8 different specimens run thus: *a.* Length of the lamina, including the acumination, 5¼ inches; breadth at the widest part, 3¼; length of the petiole, 2¼. *b.* 4¼—2½—1¼. *c.* 4—2½—1⅜. *d.* 4—2¼—1½. *e.* 3¼—2—1⅜. *f.* 3—1½—1½. *g.* 2¾—1⅝—1⅝. *h.* 2⅝—1⅝—⅝.

In a single specimen only the lamina of the leaf is narrowed toward the base, but even then, the outline is broadly ovate.

Calyx *campanulate*, minutely pubescent, *less than* 2 *lines long*, with mucronate-acute and *short* teeth, much shorter than observed in any forms of *S. palustris*. L. or *S. sylvatica*, L., to the latter of which it bears a strong general resemblance: tube of the corolla much exserted, *narrow*, 4 lines or more in length.

The two chief characters given by Koch (*Fl. Germ.* 2, *p.* 491.), by which *S. palustris* is distinguished from *S. sylvatica*, are 1. "not glandular-pilose above," and 2. "subterranean stolons clavate-thickened at the tips." The Wytheville plants lack glandular hairs, but how the underground stolons may be fashioned I do not know, since none were sent.

It is desirable that the botanists of the South and West should look up Dr. Riddell's *S. cordata*, for it is only by the study of an abundance of material brought together from every quarter that its claim to specific rank can be settled *pro* or *con*. *S. palustris*, L. in the E. United States is an exceedingly variable species. Dr. Gray's varieties *aspera* and *glabra* present numberless forms and pass into each other by insensible gradations. But from all these Mr. Shriver's plants differ in their smaller flowers, short calyx-teeth, slender corolla-tubes, larger and broader leaves and long petioles.—PROF. THOS. C. PORTER.

All communications addressed to John M. Coulter, Hanover, Ind.

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Some notes from Wytheville, Virginia.—I wish to correct a misapprehension of many botanists in reference to this part of Virginia. My remarks, however, apply almost exclusively to the immediate vicinity of Wytheville. Situated on the Alleghany Plateau, half a mile above sea level, our flora is referable naturally to a higher latitude. Our plants, therefore, are not southern, their interest being derived from their mountain, not their southern peculiarities. Without further remark I append a few notes on plants of some interest.

1. *Trautvetteria palmata*, F. & M., not here, but collected on mountains 50 or 60 miles distant. 2. *Thalictrum clavatum*, DC., only in one spot. 3. *Delphinium exaltatum*, Ait., and *tricorne*, Mx. 4. *Aconitum uncinatum*, L., is rare; stout and erect in some places; very slender and creeping in others. 5. *Zanthorhiza apiifolia*, L'Her., Pulaski County, 20 miles distant. 6. *Hydrastis Canadensis*, L., rare here and in Pulaski Co. 7. *Cimicifuga Americana*, Mx., I cannot detect. 8. *Magnolia Fraseri*, Walt., Stony Fork, 8 miles distant. 9. *Berberis Canadensis*, Pursh, passim. 10. *Jeffersonia diphylla*, Pers. 11. *Brasenia peltata*, Pursh, from an adjoining county. 12. *Adlumia cirrhosa*, Raf., on near mountain sides. 13. *Dicentra Cucullaria*, DC., rare. 14. *D. eximia*, DC., not here, but collected about 30 miles distant. 15. *Draba verna*, L., rare; *D. ramosissima*, Desv., vide 5. 16. *Viola odorata*, L., *sagittata*, Ait., *pedata*, L., *rostrata*, Pursh, *pubescens*, Ait. and var., rare, *hastata*, Mx., common. 17. *Drosera rotundifolia*, L., only and rare. *Hypericum prolificum*, L., and *Sarothra*, Mx., rather common. *H. Drummondii*, T. & G. from Bristol, Tenn. *Dianthus Armeria*, L., passim, sparingly. *Claytonia Virginica*, L., rather rare. *Geranium maculatum*, L., and *Carolinianum*, L., common. *Impatiens pallida*, Nutt., and *fulva*, Nutt., common. *Oxalis violacea*, L., rather common *Ptelea trifoliata*, L., vide 5. *Rhus aromatica*, Ait., vide 5. *Ampelopsis quinquefolia*, Mx., passim. *Pachystima Canbyi*, Gr., in one place and vide 5. *Polygala paucifolia*, Willd., in several places. *Trifolium reflexum*, L., very rare. *Robinia hispida*, L., rare. *Desmodium viridiflorum*, Beck, Buchanan, Virginia. *Stylosanthes elatior*, Swartz, rare and vide 5. *Apios tuberosa*, Mœnch, rare. *Clitoria Mariana*, L., common in the eastern part of the state; not here. *Baptisia australis*, R. Br., vide 5. *Cassia nictitans*, L., never saw but one plant; common at Grayson, White Sulphur; and vide 5. *C. Chamæcrista*, L., none; collected at Big Lick, Virginia. *Calycanthus*, wild towards Tazewell; not here. *Hydrangea arborescens*, *L.*, and *radiata*, Walt.? common. *Saxifraga leucanthemifolia*, Mx., at Salt Pond; none here. *Boykinia aconitifolia*, Nutt., found a few plants, vide 5; also on mountains beyond Hillsville; none here. *Heuchera Americana*, L., and *hispida*, Ph. *Mitella diphylla*, L., common; *nuda*, L., none. *Tiarella cordifolia*, L., Stony Fork only. *Sedum ternatum*, Mx., and *telephioides*, Mx. *Jussiæa decurrens*, DC., vide 5. *Passiflora lutea*, L., rare; *incarnata*, L., none here, but plenty east of us. *Hydrocotyle Americana*, L., Buchanan, Virginia. *Archemora rigida*, DC. *Ligusticum actæifolium*, Mx. 18. *Erigenia bulbosa*, Nutt., none; collected in Lincoln County, Kentucky. *Diodia*, vide 5. *Valeriana pauciflora*, Mx., vide 18. *Elephantopus Carolinianus*, Willd., none here; collected at Big Lick, Virginia. *Liatris graminifolia*, Willd., and *spicata*, Willd. *Aster lævis*, L., in every variety of its polymorphous phase, and *patens*, Ait., *puniceus*, L., and *Novæ-Angliæ*, L., in all their beauty and splendor. *Solidago Boottii*, Hook., passim; *odora*, Ait., rare. *Chrysopsis graminifolia*, Nutt., mountains. *Chrysogonum Virginianum*, L., vide 5. *Rudbeckia triloba*, L., *laciniata*, L., *speciosa*, Wenderoth, *fulgida*, Ait., *hirta*, L.? *Coreopsis senifolia*, Mx., mountains, passim. *Bidens frondosa*, L. *Filago Germanica*, L., very rare. *Senecio Elliottii*, T. & G.? *Lobelia puberula*, Mx., 50 miles distant. *Vaccinium erythrocarpon*, Mx., rare. *Arctostaphylos Uva-ursi*, Spreng., Hillsville, Dr. Haller. *Leucothoe recurva*, Buckley, passim. *Clethra acuminata*, Mx., 10 or 12 miles distant; *alnifolia*, L., 35 miles distant. *Azalea calendulacea*, Mx., and *nudiflora*, L., passim. *Rhododendron maximum*, L., common; *Catawbiense*, Mx., rare. *Schweinitzia odorata*, Ell., in only one place. *Galax aphylla*, L., passim. *Ilex deciduа*, Walt., rare. *Halesia tetraptera*, L., vide 5. *Dodecatheon Meadia*, L., rare. *Trientalis Americana*, Pursh., common. *Samolus Valerandi*, L., var. *Americanus*,

Gray, rare. *Ruellia strepens*, L., vide 5. *Lycopus Virginicus*, L. *Cunila Mariana*, L., mountains. *Cedronella cordata*, Benth., in two places. *Hydrophyllum Virginicum*, L., *macrophyllum*, Nutt., *appendiculatum*, Mx.; *Canadense*, L., vide 5. *Bartonia tenella*, Muhl., rare. *Obolaria Virginica*, L., passim, but in small quantity. *Chionanthus Virginica*, L. *Aristolochia Serpentaria*, L., and *Sipho*, L'Her. *Pyrularia oleifera*, Gray, Stony Fork only. *Euphorbia commutata*, Engelm., vide 5. *Comptonia asplenifolia*, Ait., none here, but abundant 50 miles distant. *Pinus pungens*, Mx. *Thuja occidentalis*, L., passim. *Taxus baccata*, L., var. *Canadensis*, in one place and vide 5. *Veratrum viride*, Ait., none here, but 50 miles distant. *Prosartes lanuginosa*, Don. *Uvularia grandiflora*, Smith. *Clintonia borealis*. Raf., and *umbellata*, Torr., common in the mountains. *Convallaria majalis*, L., common in the mountains. *Scilla Fraseri*, Gr., very rare.—Howard Shriver.

Ferns near Hanover, Ind. (*continued from April number, p.* 23.).—*Aspidium thelypteris*, Swartz., and *A. Noveboracense*, Swartz., are both common to the flat woods and also the fence rows of most of the poorer land during the autumn months. *A. Goldianum*, Hook., is very local, being confined as far as we know to a single deep and cool glen and is in that portion of it from which the summer's sun scarcely evaporates the surface moisture. Here this elegant fern assumes such a magnificent growth as to rank it first among our species in attractiveness. Amid the dampness of the rich mossy carpet and the shade of the towering cliffs this beauty finds a fitting home. Here its grand fronds, often 3 to 4 feet in length by a foot or more in breadth, tower majestically above the most ambitious of its surrounding kinsmen. *A. Filix-mas*, Swartz., is found in the ravines from August till early winter. *A. acrostichoides*, Swartz., is quite widely scattered along our streams and in the rich thickets and also occurs sparingly in the damper portions of the river bluffs. *Cystopteris bulbifera*, Bernh., is abundant in all the woods and about all the moist rocks. It appears in fruit in early summer and keeps its beauty late into the fall. Of more local range, though not rare is *Cystopteris fragilis*, Bernh. Its season of perfection of fruit and frond is during the months of August and September. *Onoclea sensibilis*, L., and also the variety *obtusilobata*, are of limited occurrence in grassy thickets and fence rows. Of the variety I have 4 or 5 specimens showing various transitions from the perfect frond and all collected in the same patch with perfect specimens of *O. sensibilis*, which fact we think goes far to show little constancy here in this variety. *Osmunda regalis*, L., is occasionally met with in the wet and flat timberland. Of the genus *Botrychium*, *B. Virginicum*, Swartz., is pretty generally distributed through our richer woods and thickets, but is by no means plentiful. With the exception of the evergreen species which retain their fruit into early spring, this is the earliest fruiting fern with us. In the fall, *B. lunarioides*, Swartz., vars. *obliquum* and *dissectum* were very sparingly found, it being the first time we have observed these ferns here, although having collected more or less for 3 or 4 years. A few other species may yet be secured from the portions of our county farther back from the river, as the rocky bluffs of some of our larger creeks together with the dense and rich bordering thickets present favorable spots for fern growth. By another season we hope the pages of the Bulletin will be able to report some interesting finds from these less accessible regions.—A. H. Young, *Hanover, Ind.*

A new Preparation for Poisoning Plants.—There are few botanists having collections of any size who are not at times perplexed to find some poison for their specimens, more efficient than the solution of corrosive sublimate now in general use. For the benefit of those wishing to make a trial of something new I offer the following:

Corrosive sublimate	1¾ ounces,
Carbolic acid	2½ fluid drachms,
Alcohol	1 pint.

This I apply to fruits and flowers with an ordinary small sized paint brush.

My collection contains at least fifteen thousand specimens, and, though I have used the above formula for five years, I have yet to find the first trace of insect or larval injury in my herbarium.—Dr. J. T. Rothrock.

Damiana.—In a recent number of the Botanical Bulletin I introduced an old plant, *Bigelovia veneta*, Gray, under the new name of *Damiana*. I then and there expressed my conviction that its vaunted medical powers would not stand the test of time. To these statements I still adhere. Since the publication of that note I have received from H. Helmich & Co., of Washington, another *Damiana*. This is probably new to science and reaches us from Western Mexico. Dr. Vasey and Mr. Ward determined it to be a *Turnera*, and the latter furnished a good description of it under the name of *Turnera aphrodisiaca*. In favor of this plant there are a number of positive statements as to its value, and also some reported failures. Besides these there are two other kinds of *Damiana*, probably both *Turneras* and both from Mexico. I do not know of any reliable information upon the medical effects (whether good or bad) of either. It is to be observed however that the family of *Turneraceæ* is accredited with tonic properties.—J. T. R.

A Monster Grape Vine.—A few days since while in the woods with a companion my attention was directed to a vine, which simply looked immense; and, as succeeding measurements go to show, would not be an unfit companion for the California Vine of Centennial notoriety. At a distance of 3 to 8 feet above the ground its trunk measured 36 inches, at 8 to 16 feet, 32 inches, giving respectively diameters of 12 and $10\frac{2}{3}$ inches. At about the height of sixteen feet it began to branch and of these branches there were nine with a diameter of from 2 to 4 inches, and six with diameters of from 1 to 1 ½ inches. These branches spread towards all points of the compass by seizing the support of many large trees near by. Comparing the heights of these trees, over which this wonderful vine had thrown its festoon of branchlets, my companion and myself came to the conclusion that if this vine were spread out upon the ground it would cover a plot with a diameter of not less than 200 feet in all directions.

Indeed, were it not for the seeming incredibility of the extent of this *native monster*, I should have said, in estimating the distance of the drooping branchlets that the branch spread in all directions from the main stalk, that it could hardly have fallen short of 125 feet.

The ground upon which this vine grows is not rich by any means. Two to three inches upon the top represent the decaying debris of the wood vegetation, while below is a compact and tenacious clay. The vine is located near the edge of the timber. The species is not known to the writer, as when observed it had neither leaves nor fruit, but it is probably *V. Labrusca*, L., as that is our common wild grape. However, as *V. cordifolia*, Mx. and *V. æstivalis*, Mx. are both found here, it might be one of these.—A. H. Y.

Dodecatheon Meadia, L.—Since writing the above I have chanced to examine a most luxuriant growth of the American Cowslip, in which I believe 10,000 specimens of this beautiful plant could be procured. The color of the flowers varies from a rich creamy white to a light purple. The base of the corolla is generally yellowish and has a fringe of reddish brown next the stamens, of which color the base of the stamens partakes more or less. The favorite position of these Cowslips seems to be in the water worn crevices of the upper lime-stone cliff-rocks.—A. H. Y.

Some new Musci, by C. F. Austin.—Dicranum (Campylopus) Rauei, *n. sp.*—Caule compacte cæspitoso brevi inferne dense tomentoso-radiculoso erecto, foliis subnitidis erectis siccitatis leniter tortilibus e basi lanceolata subulatis convoluto-concavis semel tortis margine dorsoque ad apicem minute serratis, costa mediocri excurrente, reti denso minuto subobscuro basilari duplo majore parum pellucido angulari paullulum inflato; inflorescentia dioica? capsula cylindrica erecto-sub-

incurva lævi pallida haud strumosa, seta circa 8-lineari flexuosa tenuissima gracili pallida, operculo longe rostrato, annulo angusto, peristomii dentibus profunde fissis, calyptra conico-cylindrica basi leniter fissa vix ad operculi basim decedente: colore læte fulvo-viridi.

Colorado, 1875. *Brandegee* (*Rau*).

Readily distinguished by its light yellowish green color, compact growth, shortish twisted convolute nearly smooth leaves with a subexcurrent costa and small cells, flexuose slender pedicel, slightly curved and nearly smooth capsule, and by the very short calyptra—barely more than covering the rostrum of the operculum.

It has somewhat the appearance of *D. fulvum*, but is much smaller and more compact, leaves shorter, costa narrower, reticulation larger, capsule more curved, calyptra shorter, etc. In shape, position and reticulation of the leaves, it is almost precisely like a form of *D. Schraderi*, which I have found near Closter, growing in situations where one would naturally look for *D. fulvum*, and also resembling this species almost exactly in general appearance. In *D. Rauei* the capsule is a little narrower than in *D. Shraderi*, but is of precisely the same color and is also nearly or quite as much incurved. But the latter is a much larger species, the leaves are not shining, and the pedicel is much longer and straight, and the calyptra is much larger, descending to at least the middle of the capsule.

Trichostomum? scitulum, *n. sp.*—Plantæ minutæ subcæspitosæ; caule tenui 12-lineari flexuoso-erecto; foliis distichis (semper?) e basi erecta subvaginante valde undato-patentibus abrupte linealibus canaliculatis laxiuscule areolatis valde scabroso-papillosis margine eroso-serratis,-costa percurrente (vel breviter excurrente?): cætera desunt.

On dry shaded limestone rocks at the zinc mines, Ogdensburg, New Jersey. A very small and apparently distinct species. Position of the leaves much as in *Distichium inclinatum;* but they are more undate-flexuose, less solid and not so acute, and the papillæ on their surface are larger, etc.

Barbula Closteri, *n. sp.*—Caule valde abreviato (vix ultra lineari) laxe cæspitoso, foliis recurvo-patentibus in sicco paulum mutantibus lineali-lanceolatis, canaliculato-carinatis, margine integerrimo uno alterove infra medium lenissime recurvo vel toto plano, apice obtusiusculo minutissime hyalino-apiculato (ut in *B. convoluta*), costa validiuscula percurrente vel brevissime excurrente, rete superne subminuto granuloso-papilloso inferne perlaxo hyalino: flores et fructu desunt: color læte flavido-virens.

On the ground near Closter, Sept., 1867; not since re-discovered, although frequently looked for. Nearest to *B. convoluta;* but that has the leaves more erect, more ovate (wider at the base), abruptly carinate, more acute, and the areolation is one-half smaller.

Funaria Ravenelii, *n. sp.*—A *F. hygrometrica* cui proxima est differt: foliis angustioribus patulis excurrenti-nervibus, capsula angustiore basi acutiore in sicco magis conformiter costata textura densiore, operculo magis persistente, peristomii dentibus (notabiliter ad basim) minus crebre articulatis, etc.

Seaboard of South Carolina, July, 1874, *Ravenel.*

In *F. Ravenelii* the capsule is very acute at the base, and of a dark brownish red color *even when barely mature;* when dry the ridges are very prominent and remarkably uniform, and the mouth is very oblique, being brought into nearly the same plane as the under side of the (horizontal) *capsule*; the texture is thickish and opake; the ordinary cells are heteromorphous, and at the apex of the capsule pass abruptly into the very solid dark fuscous subcubical ones, which form a narrow rim about its mouth. The capsule of *F. hygrometrica* is always pale yellow until after maturity; in the dry state the ridges are not uniform, the texture is lax and subpellucid, and there are 3 or 4 rows of cells immediately beneath the rim which are vertically compressed, and thus the ordinary cells pass gradually

into the very solid vertically much compressed (transversely elongated) indistinct ones of the rim itself. I have examined many specimens of *F. hygrometrica* from all parts of N. America, and find the capsule in all to be similar in shape and texture, and only when merging into the form known as "Var. *patula*" do I find spreading leaves; but these are broader with the costa less strongly excurrent.

Bryum Clintoni, Aust. Mss 1869. Ab. *Br. cyclophyllo* simillimo distinctum; statura multum majore foliis cochleariformi-concavis minus patentibus haud marginatis, cellulis multum crassioribus vesciculosis, costa valde inerassata, etc. Wet places along Caledonia Creek, Western New York, (1865) *Clinton*.

Rhynchostegium Novæ-Cæsareæ, Aust.—*Hypnum micans*, Wils.; not of Swartz;—*Hypnum Novæ-Cæsareæ*, Aust. Musc. Appalach. n. 440:—*Chrysobryum micans*, Lindb. Sulliv. Icones Suppl. p. 91, t. 67. This species is quite frequent in the Alleghany mountains of Pennsylvania, where it was found fertile by Messrs. Wolle and Rau in 1874. Some of the capsules are too old, but they are sufficiently well preserved to show the hypnoid character of the peristome; while there are a few of the capsules sufficiently developed to show,—when taken in connection with this character, with the habit of the plant, shape and reticulation of the leaves, etc., that its proper place is in the *Raphidostegium* section of the genus (or subgenus) Rhynchostegium. Calyptra smooth, slightly twisted, fugacious. Capsule small, subcernuous or horizontal, oval or obovate, (when old obconic and wide-mouthed,) nearly regular; operculum, shortly but very distinctly rostrate; annulus not seen; peristome hypnoid, processes as long as the teeth, more or less split in the keel, ciliolæ not seen. Pedicel very slender, about one inch long, cygneous, smooth, dark red. Perichæth densely radiculose at the base from the axils of the leaves, few-leaved; its leaves small, erect, hyaline, ecostate, straight, lanceolate-ovate, acute, distantly dentate-serrate above the middle; vaginula usually longer than the leaves, herbaceous, dark red and copiously rooting at the mouth. Pistillidia 2-8, paraphysate; the paraphyses deep yellow. The plant is dicœcious. The male inflorescence, etc., is described and figured in the Icones Suppl. referred to above. I have seen no diagnosis of Dr. Lindberg's "*Chrysobryum*," but have no hesitation in pronouncing the genus superfluous so far as this plant is concerned. It grows only upon rocks which are frequently inundated, in mountain rivulets; and, although, sometimes is abundant, it is also often nearly exterminated from the same ravine by heavy freshets.

Rhynchostegium micans (Swartz).—*Hypnum micans*, Swartz Adnot. Botan. (1829). *H. fulvum*, *H. tenue* and *H. subsimplex*, H. & W.—*H. albulum* C. Mull.—*H. albulum* and *H. fulvum*, Sulliv. Icon. (I.) tt. 112 and 125, etc. The only difference there is between the so-called varieties of this plant is in their size. What are supposed to be its two extremes in this respect are figured in the Icones, referred to above, under the names of *Hyp. albulum* and *Hyp. fulvum*. The operculum is frequently shortly rostrate at least when dry. The mode of growth is the same as in *Rhynchostegium serrulatum* and *R. geophilum;* but as the plant is subaquatic the stems are often more elongated than in either of these.

Rhynchostegium delicatulum, James: Sulliv. Icon. Suppl. p.93, t.69, is only a starved form of *Hypnum recurvans*, Schwgr.; Sulliv. Icon. I. p. 177, t. 111. In fact the figures in the Suppl. give a better representation of this most common American Hypnum, as it has generally occurred to me, than do the figures in the first volume; particularly those which represent the rather long-rostrate operculum, the strongly serrated apex of the leaf, and the much inflated cells at its basal angles (almost precisely as in *Hypnum nemorosum*). However, the species varies not a little in all these respects, (chiefly in the length of the operculum and in the serratures of the leaf—both strongly serrated and entire on the same stem. In my judgment neither *Hypnum recurvans* nor *H. cylindricarpum* are true *Rhynchostegia;* but rather a sort of connecting link between between them and the *Stereodontes*. And I have generally found it difficult to distinguish small forms of the

former, when sterile, from the latter, or large forms of it from *Hypnum nemorosum*.

Rhynchostegium Jamesii, Sulliv. Icon. Suppl. p. 92, t. 68, is no *Rhynchostegium*, as a glance at the figure of the perichæth will show!—its leaves being very large, convolute and plicate. It is no doubt *Hypnum hamulosum?* Sulliv. and Lesqx. Exsic. ed. 2, n. 478;=*Hyp. pallescens*, Muse. Appallach. n. 414!=*Hyp.* (*Cupressina*) *depressulum*, C. Mull. Manip. Musc. Nov. 1875, n. 5 and 6, p. 7!=*Pylaisæa polyantha*, James Catalogue (1864)! That it is a mere form, or var. of *Hypnum reptile*, Michx. Fl. Bor. Amer. (1803), there cannot be a shadow of doubt. And Lindberg has shown that Michaux's *Hyp. reptile* is the identical *Leskea pallescens* Hedw. Sp. Muse. (1801);—*Hyp. pallescens* (Hedw.) P. Beauv. Prodr. (1805). The moss which we now have under consideration is the var. *protuberans* (Brid.) Lindb.;—*Hyp. pallescens* Br. Eu. (In the work last quoted, as well as Schimper's Synopsis, the perichætial leaves are erroneously said to be unicostate.) I have not seen the identical specimens from which the figures were drawn for the Icones Suppl.; but have the plant as there represented from various (northern) localities. *Hyp. reptile*, var. *viride*. Muse. Appalach. n. 416, appears to be a form of this same variety (*protuberans*); in some respects it closely resembles *Hyp. adnatum* (a sort of connecting link between the *Amblystegia* and the *Stereodontes*) and is not infrequently confounded with it.

Notes on Hepaticology, by C. F. Austin.—Jungermania (Lophocolea?) exigua, *n. sp.*—Plantæ minutissimæ parasiticæ; caule subcæspitoso simplici erecto tenuissimo vix lineam longo, foliis dissitis suberectis obliquis decurrentibus ovato-quadratis acutiuscule subinæqualiter emarginato-bifidis, amphigastriis subulato-filiformibus (obsoletisve), fructu——?

Parasitic on the leaves of "*Plagiochila distinctifolia*" from Jamaica, in Herb. Taylor.—The lowermost leaves are but little larger than the amphigastria, and usually like them, subulate. There are no amphigastria above the base of the stem, where the leaves appear to be 3-ranked. Areolation minute.

Cephalozia Francisci, var. b, *fluitans*.—*Jungermania inflata*, var. d, *fluitans*, Nees. Hepat. Europ. II, p. 48; Synop. Hepat. p. 106; Gott. & Rabenh. Exsic. n. 581! Aust. Exsic. n. 35!—*Cephalozia obtusiloba*, Lindb. Bot. Not. 1872, p. 161; Dumort. Hepat. Europ. (1874) p. 89.—*C. cladorrhizans*, Geo. Stabler in litt. Jan. 1, 1876.—*C. fluitans*, Aust. MSS.

Caulis prælongus, inter Sphagna scandens vel "in aqua fluitans," e ventre flagellifero-ramosus et hic illic copiose radiculosus, dissite foliosus. Folia caulina pallida (semper?), laxa, e basi angustiori vix decurrente, oblongo-elliptica, profunde biloba, margine integerrima, sinu angusto, lobis obtusis, magis minusve inæqualibus (ventrali longiore), apice incurvo planove. Amphigastria minuta appressa inconspicua (nonnunquam obsolete) subdiformia, sed plerumque triangulari-lanceolata, apice angustissime fisso et incurvo. Flores dioici. Perichætium magnum, in ramulo ventrali longiusculo et brevissimo inferne microphyllo terminali; ejus folia caulinis subconformia, longiora, ovato-oblonga, lobis acutis vel acutiusculis; amphigastria exteriora quadrato-oblonga subeuneatave, obtuse et inæqualiter emarginato-biloba, interiora elongata, angusta et integra. Colesula (immatura) brevis, ovalis, obtusa, obtussime trigona, ore plicato sublacinulato, laciniis truncatis, nudis. Androecium (amentulo masc.) vel magnum et in caule primario vel ramulo logiusculo continuum, vel parvum et in ramulo perbrevi terminale; folia perigonialia fere conformia, conferta margine dorsali plano et nudo vel inflexo et tunc obtuse unidentato, antheridium singulum in axillo singulo foventia; amphigastria majora et magis conspicua.

var. b, flagellifera.—*Jung. inflata*, var. b, *flagellifera*, Synop. Hepat. p. 106. "——flagellis ventralibus crebris longis foliolis parvis bifidis distantibus inspersis. An distincta species?" Synop. Hepat. l. c. adnot.

I am indebted to Mr. Geo. Stabler, of Levens, England, for fruiting specimens. The plant grows in peat bogs from New Jersey to Canada, as well as in the North-

ern part of Europe. It resembles a pale form of *Jung. inflata* so closely in size, and in the shape and texture of the leaf, that it is not easy to distinguish between the two plants when they are sterile. However, besides the different character and position of the colesula, etc., the latter has the leaves more closely placed (particularly the upperones), and usually inclined to become fuscous; the stems are mostly simple, sometimes forked but never with ventral branches, and the amphigastria (extremely rare) are obtusely lobed.

CALYPOGEIA BIROSTRIS (*Tayl.*).—"*Jungermania birostris Mss. T. T.* (*Chiloscyphus*). Caule procumbente subdiviso, surculis planis, foliis distichis ovatis concaviusculis apice bidentatis, margine subundato integerrimo, stipulis subquadratis altius bifidis segmentis bidentatis. (Fructu desunt.) Planta pallidissima virens, uncialis et altior. Folia et stipularum segmente apice exsecta sinu obtuso. Nepal, (with *Hypnum hygrophilum*)." Herb. TAYL.

Stems *less* than an inch long, *not* divided but proliferous from the underside without ventral flagellæ. Leaves succubous. Much like *C. bidentula* NEES, but smaller, with the teeth at the apex of the leaves more acute, the sinus more exactly lunulate, amphigastria bifurcate, etc.

CALYPOGEIA BALDWINI, *n. sp.*—Caule elongato gracili simplici e ventre prolifero eflagellari semper?), foliis subcontiguis oblique ovatis complanatis subconvexis, apice rotundato oblique subtruncatove integro obsoleteve emarginato, margine ventrali longe decurrente, reti laxiusculo versus apicem sensim minore, amphigastriis distantibus rotundo-scutelliformibus patentibus caule paulum latioribus obscure repando-dentatis apice obtuse subemarginatis fere integris, fructu—.

Island of East Maui (Sandwich), *Dr. Baldwin.* 1875 (*Eaton*).

A very distinct species, well characterized by its slender (Omphalanthus-like), habit, and by its almost entire, ovate-orbicular amphigastria. Stems 1—2 inches long, by about ½-⅔ of a line wide. Color pale green.

MASTIGOBRYUM? INTREGRIFOLIUM, *n. sp.*—Plantæ minutæ flagelliferæ; caule rigido, foliis late ovatis obtusis vel obtusiusculis sæpe obtusiuscule apiculatis integris et integerrimis (raro apice angusto obscure valde inæqualiter emarginato-bidentatis) e basi planiuscula erecto-subverticali subincurvis, amphigastriis (quam foliis) paulo minoribus basi magis patentibus leniter concavis cæteroquin fere conformibus, reti punctiformi, cellulis parvis valde discretis opacis intercalaribus vitreo-pellucidis, fructu——.

With *Sendtnera juniperina*, Sandwich Islands, *Baldwin;* very rare.

About the size of *Sendtnera gracilis*, NEES, and somewhat resembling it, but the stems are shorter and more rigid, the leaves are broader and entire and the areolation is different, etc. Here and there a small fascicle of rootlets are found proceeding from the base of an amphigastrium. These are hyaline, nearly as long as the amphigastria, and have the free end pedately about 5 or 6 parted. (An *Mastigophora* species?)

RADULA AUSTRALIS, *n. sp.*—Ab *R. obconica*, Sulliv. cui valde affinis differt: statura paulum majore, foliis magis ovatis, lobulo majore obtusiore, reti pellucidiore, perianthio longiore basi minus angustato textura haud opaco, et præsertim inflorescentia dioica.

Near Augusta, Georgia, *Sullivant* (1845). Aments (male spikes) short and broad, found only on the branches, which are of various lengths, terminal (or rarely interrupted). Perianth elongated, compressed-cylindrical from a pyriform or obconic base, the mouth 2-lipped, the lips emarginate or crenate; its texture is similar to that of the leaves. Stems ½-1 inch long, prostrate, sparingly subpinnately branched, loosely cæspitose. Leaves nearly or quite as decurrent as in *R. pallens* (SWARTZ), lobule adnate to the stem along its inner margin. *R. pallens* is a larger species, with stems dichotomously (never pinnately) branched; aments much longer, not terminal, perianths less elongated (always?), lower lobe of the leaf smaller and less acute, areolation not so distinct, etc.

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Some notes from Pulaski County, Va.—During a ramble on the shores of New River I found a third locality of *Pachystima Canbyi*, as follows: We started from Robt. Calfee's down a road to the river, came out at Mr. Howard Calfee's, not far below "*Coster's Ferry*," Pulaski Co., or several miles from Major Graham's Iron Furnace. From Howard Calfee's we strolled *up* the river under the huge rocky cliffs, until we reached a point where a rivulet empties into the river. Here we ascended the steep hillside to a spot called (as usual) after his Satanic Majesty. It is a huge cleft, rent by an earthquake or some rocket of the devil whose name it bears. At the bottom of the cleft, Mr. Forney tells me, he found *Phacelia Purshii*. I noted *Saxifraga Virginiensis*, and *Draba ramosissima* as strange. Now ascending a little above the Devil's Cleft, with your eyes open, *Pachystima* can be found. Along the river bank we saw *Claytonia Caroliniana*, *Hydrophyllum appendiculatum*, a *Lonicera* (*sempervirens?*) on the cliffs, *Rhus aromatica; Taxus baccata; Ruellia; Baptisia astralis;* etc. At Mr. Forney's we have *Diodia; Chrysogonum; Pachystima; Asarum Virginicum* and *macrophyllum; Corydalis; Hydrastis; Rhus aromatica; Draba verna* and *ramosissima; Tradescantia; Ptelea trifoliata; Jussiæa decurrens; Dianthera Americana; Passiflora lutea; Taxus baccata; Negundo; Aplectrum; Asplenium Ruta-muraria; Holcus lanatus*, 30 acres, passim; *Aster oblongifolius; Halesia tetraptera; Silphium perfoliatum; Zanthorhiza; Boykinia; Aralia quinquefolia; Cacalia Suaveolens* and *reniformis*. This rich hill is unchanged from that primeval condition when the productions of nature were of a gigantic type. The animal kingdom has degenerated, but the mineral and vegetable hold their own. The bosom and bowels of the earth are crammed with iron ore, zinc, lead, copper *et id omne genus;* while vegetation luxuriates on the decomposition of such hardy products. I should have directed the notice of the Centennial botanist and geologist to this region, but it would have been unfair to the country at large to sustain the comparison. *Delphinium tricorne* or *azureum* is distended to the utmost limits of its genus, like a fat baby of a few years old weighing over a hundred instead of thirty. Its deep bright blue, or rather purple, is magnificent beyond description. *Erythronium* full as wide as the name just written, with beautiful bright spots.—Howard Shriver, *April 22d.*

Some Notes from Herbert E. Copeland.—The revelations given by the blunders of Nature have always an interest that her ordinary handicraft does not possess. Through these, it has been said, we learn the plan of the work. The field botanist is constantly given opportunities for these rare insights and learns to record them after forgetting some of great personal value.

As an illustration of the homology between the parts of the flower and the leaf, I have an example in a branch of *Rosa blanda*, that has petals arranged as leaves, alternate and single, but highly colored, while a perfect flower and ordinary leaves are borne higher up.

Bearing on the proof of intergrading of parts are wild double flowers It is

All communications addressed to John M. Coulter, Hanover, Ind.

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not unknown that the best efforts of the florist are often anticipated in the woods. I have three specimens of *Cypripedium candidum* with two lips each, at the expense of the sepals of course. *Sanguinaria Canadensis* is widely variable in these ways. I have one with eighteen petals arranged in several rows, making a most beautiful flower. On the other hand, the number of stamens is often forty or more.

Pubescence in plants is due largely (altogether?) to conditions of growth. Thus in March I brought home *Ranunculus abortivus* and all the stems that grew after its settlement in the house were of the variety *micranthus*. I have also *Phlox divaricata* with smooth and *evergreen* leaves. It may be interesting to collectors to know that *Stellaria pubera* grows here abundantly even in low ground.—*Indianapolis, Ind.*

Some plants new to the Flora of Jefferson County.—Mr. A. H. Young and the writer have each published a partial list of the flora of Jefferson Co. in the Reports of the State Geological Survey for 1870 and 1874. Since that time many plants have been added to those lists, the most intesting of which I wish to record here. This spring has been one of wonderful vegetation, many species of rare occurrence growing in unexampled abundance, and several having been found never noted before. Early in the spring *Anemone nemorosa*, L. was found growing in a little patch near the summit of a rocky bank along one of our brooks. The little fellow had started modestly, for a dozen plants was all we could count and the most careful search in the neighborhood revealed no others. *Stylophorum diphyllum*, Nutt. a few weeks ago covered acres with its yellow bloom and coarse stems and leaves. *Dentaria diphylla*, L. was found in unusual abundance and beauty. Last spring *Draba verna*, L. was found in considerable abundance, but no specimens have been seen this season. *Raphanus Raphanistrum*, L. has been found taking possession of some of our fields. *Hibiscus Moschevtus*, L. and *Trionum*, L. were both found last season. Two or three specimens of *Waldsteinia fragarioides*, Tratt. were found this spring at Clifty Falls. *Amelanchier Canadensis*, T. & G. was filling the bare woods with its white blossoms early this season in a way to make us suspect that it was not as nearly killed out as we feared. *Ludwigia palustris*, Ell. was found in great abundance last season, along with *Ammania humilis*, Mx. *Zizia integerrima*, DC. was seen for the first time at Heart's Falls about the first of May and seems to have established itself quite firmly. *Symphoricarpus vulgaris*, Mx. grows quite abundantly in one locality known as the Devil's Backbone. *Viburnum molle*, Mx. is blooming profusely this spring. *Valeriana pauciflora*, Mx. is making a greater display now than we have ever seen, covering a whole hillside with its graceful stems and beautiful flowers. The beautiful and showy *Aster azureus*, Lindl., found sparingly in 1874, was obtained in abundance last season; also *A. Tradescanti*, L., *A. miscr*, L., *A. prenanthoides*, Muhl. in great abundance, and *A. Novæ-Angliæ*, L. A fine patch of *Brachycha ta cordata*, T. & G. was found at Clifty Falls and is a beautiful and well marked species. *Silphium trifoliatum*, L. has been found sparingly. Two new *Helianthi* were found, *H. tracheliifolius*, Willd. and *H. doronicoides*, Lam. A few specimens of *Mulgedium acuminatum*, DC. have been secured. It was with considerable surprise that we found *Chimaphila maculata*, Ph., in the early part of May, growing in a dense woods. Our *Ericaceæ* are so few and far between that any addition to the short list is quite an acquisition and is highly appreciated. *Ilex mollis*, Gray, is abundant this spring. A single specimen of *Plantago sparsiflora*, Mx. has been found, but more will undoubtedly be secured. *Gerardia purpurea*, L., was discovered in some out of the way fence corners. *Phacelia bipinnatifida*, Mx. seems to be very uncertain in its growth. For two seasons I watched closely for it and did not secure a single specimen, but this spring our hillsides are fairly blue with it and its presence may be perceived by the peculiar pungent odor rising from it. *Phyllanthus Carolinensis*, Walt. was found in great abundance last season. *Comandra umbellata*, Nutt. was found growing in a thicket this spring. *Quercus palustris*, Du Roi. is common, and that mixed up species *Q. falcata*, Mx. which stands between *Q. nigra* and *Q. triloba* and which has

growing on it here the leaves of all these three species. *Pogonia pendula*, Lind., was found last summer, and this spring some beautiful specimens of *P. verticillata*, Nutt. were secured. *Medeola Virginica*, L. has been found this season in small patches, but promises to spread. *Uvularia sessilifolia*, L. is blooming only in tolerable abundance. Late last year *Heteranthera reniformis*, R. & P. was found occupying two or three swampy places. Such are a few of the additions made within a year to the flora of Jefferson County and we hope that a season that has begun so auspiciously as this one may bring us many new and rare forms.—Ed.

The Sixth Number of Contributions to American Botany by Sereno Watson, issued February, 1876, is divided into three parts. The first part is on the Flora of Guadalupe Island, Lower California, giving us the position of the island and the resemblances of its flora to those of other regions. The author concludes that the flora is to be considered a part of that of California. The number of species collected was 131. Of exogenous plants there were 102, of endogenous 8. The remaining 21 were Ferns, Mosses and Liverworts. The second part gives the list of this collection with Dr. Palmer's notes. The third and most important part consists of description of new species of plants, chiefly Californian. There are also revisions of four genera, *Trifolium* with 39 species, *Lathyrus* with 13 species, *Megarrhiza* with 5 species and *Peucedanum* with 20 species.

Some Oregon Plants.—The following interesting little list of plants have just been received by the Editor from L. W. Lee, Esq., of Josephine County, Oregon, and determined by Prof. Porter:

Delphinium Menziesii, DC.—A starveling specimen.

Anemone nemorosa, L.—Form?

Ranunculus Nelsonii, Gray.

Dentaria tenella, Ph.

Viola glabella, Nutt.—With rather large stipules!

Claytonia linearis, Hook.

Erodium cicutarium, L'Her.—Dwarfs.

Ribes Menziesii, Pursh. (*R. Californicum*, Hook. and Arn. *R. subvestitum*, H. & A.)

Tellima parviflora, Hook.—Watson says "flowers *white*"; Hooker, "deep rose-color," as these appear to have been.

Oreodaphne Californica, Nees.

Gaultheria Shallon, Ph.

Dodecatheon Meadia, L.—Form.

Synthyris reniformis, Benth. (*Wulfenia reniformis*, Hook., *Fl. B. Am. t.* 171.)

Sisyrinchium tinctorium, H. B. K.—A most beautiful flower. My specimens from Hall (in fruit only) through the alcohol used in poisoning have left a dark stain on the paper.

Erythronium grandiflorum, Ph.—?

Notes on Hepaticology by C. F. Austin.—Lejeunia Hildebrandi, *n. sp.*—Caule debili prostrato tenui, foliis laxis distantibus lanceolatis obtuse subacuminatis laxissime areolatis convexis erecto-patentibus, lobulo longiusculo tumidulo, foliis involucralibus subconformibus, amphigastriis nullis, perianthio minuto subsessili lævi.—*Lejeunia longifolia*, Vol. V, p. 17 of the Bulletin of the Torrey Botanical Club. On *Dumortiera denudata*, Sandwich Islands.

L. longifolia Mitt. has subelliptical leaves from a narrower often subcostate base, and of a less lax texture. *L. elliptica*, L. & L., another closely related species, has shorter obovate-elliptical leaves, a narrower perianth, etc.

Lejeunia Ravenelii, *n. sp.*—Caule brevi flexuoso supra convexo, foliis imbricatis obdeltoideo-orbicularibus valde convexis, lobulo minuto subinflato, amphigastriis minutis rotundis bilobis, lobis (sinuque) obtusis, reti foliorum magno valde obscuro uniformi, cellulis supra convexis, intercalaribus angustis: dioica, flore fœm. et fructo ignoto.

On the bark of trees, "Seaboard of South Carolina," *Ravenel* (1874). A small species, of a yellowish color. Looks much like a small form of *L. clypeata*, which it also resembles very closely in its opake leaf-cells; but is readily separated from it by its more convex leaves and bilobed amphigastria.

Lejeunia Caroliniana, *n. sp.*—Caule perbrevi (1–2 lin.) flaccido; foliis rotundis convexis squarroso-patentibus subverticalibus confertis sed laxe imbricantibus in siccis margine apice valde decurvis, lobulo parvo subinflato, rete e cellulis mediocribus poriformibus illis versus marginem sensim minoribus intercalaribus latissimis formato; amphigastriis rotundis bifidis; colesula pyriformi subcompresso quinquangulato, angulis nudis: monoica; amentula masc. magna terminali et laterali.—With *Frullania Kunzei*, var. in Aust. Hepat. Exsic. from Mobile, Alabama, *Sullivant* (1845). About the size of *L. Ravenelii*, but of a subfuscous color, and rather flaccid habit.

Lejeunia læte-fusca, *n. sp.*—Caule repente 5–8 lineas longo; foliis magis minusve imbricatis latissime falcato-ovatis patentibus leniter convexis deplanatis obtusis (in medio fere usque ad basim cellulis 2 vel 3 multum ampliatis) maculatis, lobulo minuto subovato valde inflato, reti basilari et centrali magno versus marginem sensim decrescenti, amphigastriis parvis orbiculatis bifidis, segmentis erectis acutiusculis: colore læte-fusca: cætera desunt.

A few stems of this apparently very distinct species were found in a southern collection, made by Mr. Sullivant in 1845; mixed with *L. ovata*, Tayl. and *L. Læte-virens*, N. & M. About the size of *L. flava*, (Swartz). Readily distinguished by its fuscous color, and by the 2–3 much enlarged cells in the center next to the basal row.

Lejeunia obcordata, *n. sp.*—Caule arcte repens debili prolifero-ramoso brevi tenui, foliis ratione caulis magnis elliptico-rotundis subimbricatis patenti-subverticalibus integerrimis convexis, lobulo mediocri inflexo tumidiusculo margine parce dentato, rete magno discreto, amphigastriis nullis, perianthio parviusculo latissime obcordato bialatove compresso margine versus apicem crenulato ore minute mammillato, involueri foliis quam perianthio dimidio brevioribus æquilobis obovatis obcuneatisve integerrimis; inflorescentia monoica, amentulis numerosis brevibus tectis.

On some small fern, with *Mastigobryum patens*, Mont. (*M. parvistipulum*, Aust.), Sandwich Islands. Well characterized by the perianth, which is compressed, much expanded and broadly emarginate at the apex.

Fossombronia Macouni, *n. sp.*—Caule incrassato brevissimo; foliis imbricatis verticalibus incurvis valde cristato-undulatis et plicatis acute inciso-dentatis; colesula parva cupulato-infundibuliformi, margine crenato et subundulato; capsula magna longiuscule exserta, elateribus crassiusculis bispiris longiusculis, sporis parviusculis subopacis densissime minutissime papillosis.

Portage La Loche, Lat. 57, Sept. 1875, *Macoun*. Readily distinguished by the vertical and incurved leaves, short wide-mouthed colesula and minutely and closely papillose spores. Colesula with the short base leafy-squamulose.

Fossombronia Wrightii, *n. sp.*—In adspectu *F. angulosæ* valde affinis sed differt: sporis valde opacis dense minute tuberculatis, elateribus longioribus angustioribus, foliis magis acute angulatis, etc. On riparian rocks, Cuba, *Wright*.

Fossombronia Cubana (Gott.) Aust.—Differt ab *F. angulosa* proxima; foliis latioribus, sporis minutius reticulatis, elateribus angustioribus.—*F. pusilla*, var. *Cubana*. Gottsche in Wright's Hepaticæ Cubenses.—*F. Texana*, Lindb. in Act. Soc. Fenn. X, p. 533. Texas and Cuba, *Wright*.

A few specimens of the Texas plant were distributed by me, in the Hepat. Exsic., under No. 118 (*F. longiseta*). The Texas plant is about the size of ordinary forms of *F. angulosa*; and the Cuban plant appears to differ from it (the Texas plant) only in size, being 2 or 3 times larger.

Botanical Bulletin.

Vol. 1. JULY, 1876. *No. 9.*

CARICES IN WASHINGTON, D. C.—In the vicinity of Washington, D. C., there are about 60 species of *Carex*, of which some are interesting and deserving a short notice.

Carex Willdenovii, SCHK. is frequent on woody hill-sides. *C. Steudellii*, KUNTH. is more abundant but in deeper shade. *C. bromoides*, SCHK. I have found only in bogs near the river; never on upland bogs. *C. muricata*, L. occurs in the grounds of the Ag. Dept., probably introduced among foreign seeds. We have *C. sparganioides*, MUHL., *C. cephalophora*, MUHL., and *C. Muhlenbergii*, SCHK., besides one or two intermediate forms difficult to classify. I have only seen *C. canescens*, L. from one locality; I did not expect to find it so far south. *C. fœna*, WILLD. is common in meadows and low grounds near the river. A variety of *C. aquatilis*, WAHL. is found in the river marshes. It is less robust than the northern form, with more slender spikes, approaching *C. stricta*. *C. torta*, BOOTT is quite rare, occurring only in two localities so far as I have observed. *C. Shortiana*, DEW. occurs in several localities in low ground, but *not* in marshes. A remarkable form of *C. tetanica*, SCHK. is found in open woods in thin patches. The rhizoma runs near the surface of the ground, covered with decayed leaves, and sends up numerous tufts of long radical leaves, and but few fruiting culms which are slender and with two or three lax spikes, one of which is usually sub-radical and long peduncled. It is the same form which was found in Jeff. Co., N. Y., over 30 years ago by Dr. Wood and named for him *C. Woodii* by Prof. Dewey. It is a very distinct form if not entitled to be called a species. *C. granularis*, MUHL. is rare, but a closely related species *C. glaucodea*, TUCK. is quite common in open woods in clay soil. *C. pallescens*, L. I have found in very small quantity. It appears to be south of its usual range. *C. virescens*, MUHL. and *C. triceps*, MICHX. are very common, with, I think, the form called *C. Smithii*, PORTER. *C. plantaginea*, LAM. has not been observed here, but *C. platyphylla*, CAREY is common, and also the broad leaved form of *C. laxiflora*, LAM. We have also the *C. laxiflora* var. *stylosa* (*C. stylosa*, DEW.). It appears to be worthy of specific rank. *C. retrocurva*, DEW., one of the most graceful of Carices, is abundant, as is also *C. digitalis*, WILLD. but they are perfectly distinct. *C. retrocurva* has glaucous and broader leaves, and the culms are always prostrate, or nearly so. *C. oligocarpa*, SCHK. and *C. Hitchcockiana*, DEW. are both here and quite distinct. *C. umbellata*, SCHK. occurs sparingly in the usual situations, and also *C. nigro-marginata*, SCHW. on rich woody hill-sides. *C. Emmonsii*, DEW., *C. Pennsylvanica*, LAM. and *C. varia*, MUHL. are here with intermediate and puzzling forms, some of which may be *C. Novæ-Angliæ*, SCHW. In moist sandy woods we have sparingly *C. vestita*, WILLD. *C. squarrosa*, L. and *C. stenolepis*, TORR. are both frequent in low grounds.—GEO. VASEY, *Department of Agriculture, Washington, D. C.*

A NEW CYPERUS.—The sedge noticed below was sent me by Mr. Wolf, the discoverer, and first published in the January issue of the "Bulletin of the Torrey

All communications addressed to John M. Coulter, Hanover, Ind.

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Botanical Club." As the new species is native in your vicinity, you may facilitate its re-discovery by giving it place in your BULLETIN.

CYPERUS WOLFII, *n. sp.*—Culm triangular, glabrous, leafy at the base. Umbel simple, about 5-rayed, rays very unequal, monocephalous. Heads spherical, simple, of many spikes. Involucre about 5-leaved, 2 of the leaves nearly as long as the culm. Spikes densely capitate, oblong, 4—5-flowered, scales imbricate, obtuse, submucronate, 11-nerved, with a green keel. Rachis broadly winged with a pair of hyaline awn-pointed scales. Filaments 3, deciduous. Style trifid. Achenia triangular—obovoid, apiculate, incurved.

Found by Mr. John Wolf, of Canton, Illinois, in Anna, Ill. The culms are 2-3 feet high, slender, the leaves nearly as long, narrowly linear, those of the involucre more than half as long. The spikes are 3—6 lines long, 3—6-flowered, finally a little brownish.

In general aspect it resembles *C. filiculmis*. but differs widely in its spikes, both from this and from *C. Grayi*. It is most nearly allied to *C. Sieberi* (Kunth.) of Australia, but the short involucre, and composite heads, and 6—9-flowered spikes of that species are sufficiently distinctive.—A. WOOD.

SOME NOTES FROM PULASKI COUNTY, VA.—I send you an *Arisæma* to show you the size of things here. Many plants growing to moderate size elsewhere, assume huge proportions on the red soil of Rich Hill. The bank of New river under the hill-side was splendidly set off a few weeks ago with the graceful bells of *Halesia*. Beneath, a month later, I found a variety of *Viola tricolor*, *Woodsia obtusa*, *Saxifraga Virginica*, and a few other things. Our cliffs are now covered with the Saxifrage. I also found *Draba*, and a variety of *Sedum*, with snowy flowers. The stem shoots up from amid rosulate leaves, which are obovate, or very short-spatulate, often not rounded, but wedge-shaped, giving the idea, at first, of leaves of *Draba ramosissima*. Stem leaves spatulate to *linear-spatulate*, *close* set on the *high* simple stem, and more sparingly on the three branches at its summit. Parts of the flower in 4s (center one in 5s), *ovate-lanceolate*, somewhat pointed petals *twice* the length of the ovate, blunt sepals. It is probably *S. Nevii* which Mr. Canby found on Salt Pond Mountain.—HOWARD SHRIVER.

PLANTS NEW TO JEFFERSON COUNTY.—After making out a list of plants new to the flora of Jefferson County, for the last number of the BULLETIN, Mr. A. H. Young handed me the list given below, containing plants recently found but not included in the list of last month.

Ceanothus Americanus, L.
Lespedeza violacea, Pers.
Apios tuberosa, Mœnch.
Hydrocotyle Americana, L.
Aster carneus, Nees.
" *æstivus*, Ait.
Solidago radula, Nutt.
Helianthus tomentosus, Mx.
" *strumosus*, L.
Coreopsis trichosperma, Mx.
Bidens cernua, L.
Artemisia biennis, Willd.
Nabalus albus, Hook.
" *altissimus*, Hook.
Eleocharis obtusa, Sch.
Scirpus Eriophorum, Mx.
Aphyllon uniflorum, T. & G.
Pedicularis lanceolata, Mx.
Scutellaria canescens, Nutt.
Lithospermum hirtum, Lehm.
Quercus imbricaria, Mx.
Alnus serrulata, Ait.
Juniperus Virginiana, L.
Cyperus diandrus, Torr.
" *flavicomus*, Mx.
" *inflexus*, Muhl.
" *phymatodes*, Muhl.
" *strigosus*, L.
" *Michauxianus*, Schultes.
" *ovularis*, Torr.
Kyllingia pumila, Mx.
Fimbristylis autumnalis, R. & S.
Osmunda cinnamomea, L. ED.

SOME CARICES NEAR HANOVER, IND.—No justice has been done to the large and interesting genus *Carex* in this neighborhood, and we are but beginning to get to-

gether the material for its thorough working up. A large collection of *Carices* from all parts of the county is to be made this season and then we can hope to do more justice to the subject. As this number of the BULLETIN seems to be devoted to the interests of *Carex* we have thought it would be interesting to put on record such *Carices* as have been heard from, with a few disconnected notes that have been made when determining them.

Carex vulpinoidea, Mx.—This is one of our most abundant sedges, probably standing next to *C. triceps* in that respect. We have found here all the different varieties, the perigynia varying from broad ovate to lanceolate, and the beak becoming strongly serrate. The achenium is a beautiful shape, having the outline of a balloon, as near as I can express it, and on the rounded top of this balloon rests a slender style nearly as long as the achenium and plainly thickened at base. *C. stipata*. Muhl. This has a wonderful look like *C. vulpinoidea*, but a little examination shows it to be different in many points. Its perigynia are lanceolate, although the other has that form occasionally, more strongly nerved, longer and rougher beaked, and the style is *twice* the length of the achenium.

C. sparganioides, Muhl. The narrow margin of the perigynium of this species is very sharply toothed.

C. cephalophora, Muhl. We have this species with its short ovoid head of spikes, its perigynia with 3 or 4 indistinct nerves on one side, but the style is as short and bulbous as in *C. Muhlenbergii*.

C. Muhlenbergii, Schk. var. *enervis*. Boott. Very little of the typical form has been found unless 3 or 4 nerves mean "many-nerved." We have the oblong head of bracted spikes, the short-beaked perigynia and the very short bulbous style, but in none have I been able to count more than 3 or 4 nerves on each side of the perigynium. A characteristic that might well be noted is that the bristle-shaped bract subtending the lowest spike is very much elongated, sometimes being 3 times the length of the head.

C. rosea, Schk. has been found in considerable abundance in damp woods.

C. scoparia, Schk.—This is found every where in meadows and is very easily distinguished by its chaffy-looking, straw-colored spikes. When the perigynium is looked at by transmitted light the membranaceous wing, with its fringe of spiny points, comes out strong and is translucent, containing one and sometimes two dark-looking nerves. In my specimens the style is three times as long as the achenium and the stalk but one-half shorter.

C. Buxbaumii, Wahl. is one of the most graceful of our *Carices*. The scale is not all brown-purple, but two or three nerves, looking like a broad midrib, run between the dark purple sides in a light green band and are continued into a long awn which is two or three times as long as the lower part.

C. gracillima, Schw. A most beautiful sedge. It may be owing to poor drying, but the perigynia in all my specimens are light brown instead of green. The white scales are all short awned. In all the specimens found the uppermost spike bore at the apex 4—6 fertile flowers.

C. virescens, Muhl. In some of its forms this species looks like the next, but a glance through the glass at its perigynia, looking like little chesnut burs, even when mature, does away with all thoughts of resemblance. The bright, transparent scale has running through it a strong green midrib terminating in a rigid, cuspidate, rough point.

C. triceps, Michx. Of all *Carices* this is by far the most abundant here. It covers the ground for acres and the young collector here is apt to find half of his collection of Carices *C. triceps* and the other half *C. laxiflora*. We find here both the very hirsute and nearly smooth varieties.

C. digitalis, Willd. is rather rare. In the specimens collected the leaves are twice as long as the culms and the whole plant resembles some forms of *C. laxiflora*.

C. laxiflora, Lam. This surpasses all our other *Carices* in variety, although not in abundance. It straggles over the ground with long, weak, reclining culms, or stands in little upright tufts. The commonest variety is var. *plantaginea*, Boott., which is found in considerable abundance on rich hill-sides.

C. oligocarpa, Schk. occurs but sparingly, but is well distinguished by its densely striate perigynia. All my specimens have the point of the perigynium somewhat oblique and sometimes it is so nearly recurved I would be tempted to call it *C. Hitchcockiana*, but for its very smooth leaves and sheaths and slender habit.

C. eburnea, Boott. This delicate and beautiful little *Carex* grows in dense bunches in Clifty ravine and mats the bases of some of the limestone cliffs with its soft spray. The good fruiting specimens seem to be rather hard to get, for it takes careful hunting here to get all that is wanted.

C. Emmonsii, Dew. probably occurs here but no perigynia have been found mature enough to satisfactorily settle the point.

C. Pennsylvanica, Lam , *C. pubescens*, Muhl., *C. debilis*, Michx., and *C. lanuginosa*, Mx., all occur in abundance.

C. tentaculata. Muhl. The section of *Carices* with long-beaked and inflated perigynia, is well represented here. This, together with the four following species fill all our swampy ground, and could be secured by the thousands. This species, in my opinion, has the most beautiful achenium of any *Carex* with which I am acquainted. The graceful outline and the papillose-roughened surface make it an exceedingly lovely object when looked at through a good clear glass. There is one peculiarity about it that I have not seen mentioned anywhere. I have opened dozens of the inflated perigynia and in every case have found the long style ascending from the achenium bayonet fashion, making two sharp bends. A line or two from the top of the achenium it makes a sharp bend until it reaches the wall of the perigynium and then hugs it closely to the apex. It reminded me strongly of the long bent middle awn on the lower palet of *Aristida dichotoma*, Michx. May be this is a contrivance for burying the achenium on the principle suggested by Mr. Francis Darwin in the case of *Stipa pennata*.

C. intumescens, Rudge. This is probably the most abundant of the last five species in this list. In nearly all specimens collected the beak is perfectly smooth except the two teeth which are very rough.

C. lupulina, Muhl. This is the largest, coarsest looking sedge we have, and one would hardly expect to find any beauty in it. But if one of those large bladdery inflated perigynia be looked at through a glass, any one will confess its beauty. The walls of the perigynium seem to be more membranous than usual and easily let the light pass through them. This brings out about twenty prominent nerves which stand up sharp and distinct, while between these is the most delicate reticulation. Now strip off the perigynium and look at the large achenium and long style. The same delicate reticulation extends from the bottom of the achenium to the tip of the style, making it all look like one piece. The style in this species makes the same bends as that in *C. tentaculata*, but instead of bending in the same plane it makes a spiral twist.

C. squarrosa, L. In all my specimens the scales are lanceolate-acute and very far from "blunt." The perigynia of this species have the same reticulation as that above, but they lack the strong ribs of the former. The achenium and style are reticulated in the same way, but seem very much darker. The style has the same twist as in *C. lupulina*, but still more so, often making three bends in a spiral.

C. stenolepis, Torr. The long awn-like scales of this species when seen through a microscope remind one of the weapon of the saw-fish. The beak rises from the very deeply sunken summit of the perigynium. The achenium is decidedly wedge-shaped in outline with a short abrupt point.

Several other *Carices* have been collected but have not yet been studied.—Ed.

Botanical Bulletin.

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NEPETA GLECHOMA, Benth.—I send you a quotation from a letter of Dr. Gray to Mr. Canby in reference to a playful little plant which comes from abroad, but is quite at home here. It is spread in every direction and has attracted my attention for a number of years before I heard of its sportive character. Prof. Wood ventured the opinion, that "unless the crosses were present it was a new plant." Now, I have examined the plant for some 15 or 20 years in hopes of seeing that interesting little mark; but, on the contrary, the anthers of my *Nepeta Glechoma* are *usually inconspicuous*, *often abortive*, at times, amounting to absence of, at least, two of the anthers and stamens. Dr. Gray says it is a "condition rather than a variety;" and a very good humored gentleman, who lives in Easton, calls it a "sport." Whereat an indignant botanic friend here says, "if ours is a *sport*, with its invariable form, covering two counties and never showing the least departure from its so easily recognisable identity, save in that one place at Draper's, then *all varieties are sports.*'"

But now for the "Head Center." "The *Nepeta Glechoma* used to bother me so here when I wanted it for my class, and it would not make good stamens when I wanted them! But in vacation, when I did not care, it made its crosses all right, so I have had no patience with it ever since. Now, being a *foreigner*, it has no business making new varieties here. It is quite enough if we let it be *naturalized*."

Whatever it may be called, whoever sees it *here* will regard it a little beauty. It ornaments the hanging baskets of our ladies; but, on the ground, trails or hangs in festoons or enthrones itself in some tiny nook near the mountain rivulet, fitting its modes of growth so as to appear to the best effect "sportively."—HOWARD SHRIVER.

[The crosses of *Nepeta Glechoma* have always been a worry here. The plant occurs in wonderful profusion, making very large patches. I have examined these patches when in most luxuriant flower and have *never seen a single cross* and the anthers behave very much as Mr. Shriver has said. I have charged my class to examine all the *Nepeta* they could and they have never succeeded in finding a cross in this neighborhood. Strange to say, though, *all* the *Nepeta* that grows across the Ohio River, within sight of us, has these crosses.—ED.]

THE "KNOBS" OF SOUTHERN INDIANA.—The nearest approach to a mountain range found in Indiana, is in that somewhat remarkable line of hills known as the "Knobs." Starting in Floyd county, from a point on the Ohio river below New Albany, they extend in an irregular northerly course, in a general direction almost parallel with the Cincinnati uplift, through the counties of Floyd, Clarke, Scott, Jackson and Lawrence. All along their course they rise abruptly from the surrounding valleys to a height of from 300 to 600 feet. Sections of these hills give the following as the most general formation: ochreous clay, stratified chert beds, layers of stratified sandstone alternating with shale, massive sandstone with concretions of iron, limestone, and black slate. (*Cox, 5th Annual Rep., p.* 168.)

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From the disintegration of these various rocks we would naturally expect to find a soil containing in a small range the necessary conditions for a marked and characteristic flora. Nor are we disappointed in this, since the flora of this range is one of the most distinct and interesting in the state. Plants are found growing here whose range is much farther south. These hills are justly ranked as being among the finest fruit growing regions of the west, possessing good exposure and being remarkably free from frosts, which, in the valleys below, prevent the successful cultivation of such luxuries. Throughout this whole region we find extensive and productive peach orchards, returning to their owners an almost certain crop. Everything goes to show that for a long time "these knobs have been protected by their peculiar structure from the effects of sudden "cold snaps," for on such high knolls, chestnut trees three to four feet in diameter are growing, vigorous and fruitful. These trees cannot bear fruit, can hardly live in the cold temperature of the valleys." In the fifth annual report of the Indiana State Geological Survey the following species are given as representing the most important timber of these hills in Clarke and Floyd counties: *Quercus monticola*, *Q. alba*, *Q. rubra*, *Q. tinctoria*, *Q. obtusifolia*, *Pinus mitis*, *Carya amara*, *C. alba*, *Cornus florida*, *Liriodendron Tulipifera*, *Acer rubrum*, *Nyssa multiflora* and *Rhus aromatica*. This list could doubtless be much increased were a careful study given to the subject. Especially in the oaks would this be true, the hills giving the exact conditions for *Q. ilicifolia* and *Q. falcata*.

The *Ericads* are few and far between over the most of Indiana and, in fact, over the whole of this great interior basin. But these hills seem to supply the exact conditions necessary for their growth. We find *Vaccinium stamineum*, *V. vacillans*, *Epigæa repens*, *Oxydendrum arboreum*, *Kalmia latifolia*, *K. angustifolia*, several species of *Pyrola*, *Chimaphila maculata* and *umbellata*, *Monotropa uniflora* and *Hypopitys*, and several others that I do not recall. *Agave Virginica* is found in considerable abundance, and *Iris cristata* and *verna*. Among the *Liliaceous* plants are found several *Trilliums*, *Medeola Virginica*, *Melanthium Virginicum*, *Stenanthium angustifolium*, *Amianthium muscætoxicum*, *Chamælirium luteum*, *Prosartes lanuginosa*, and several others. A collection of plants from the knobs has just been received but not studied. The species given above are those that caught my eye in a very cursory examination. Careful study will doubtless reveal many plants more interesting than any mentioned and disclose a flora of small range, around which can be drawn sharp and well defined boundary lines.

The Forest Trees of Cass County, Ind.—The character of the soil in this county, as we might expect, gives, to a certain extent, character to its forests. Originally low and swampy, when redeemed by drainage the soil is found to be a rich black loam. Instead of the great preponderance of Beech (*Fagus ferruginea*, Ait.), to be observed in the southern counties of the state, we find the *Querci* to be the most abundant. From a somewhat hurried examination of the forests, I should say that the different species of this genus comprised at least 50 per cent. of the entire forests; *Fagus ferruginea*, Ait., about 10 per cent.; Black Walnut (*Juglans nigra*, L.) about 10 per cent.; Shag-bark Hickory (*Carya alba*, Nutt.), and the Tulip-tree (*Liriodendron Tulipifera*, L.), each about 5 per cent., the remainder being made up in greater or less quantities of the ordinary forest trees of the west. The oaks, excelling so largely in numbers, constitute of course the chief point of interest in the study of the forests. I have noted of this genus the following species: *Q. alba*, L., *Q. bicolor*, Willd., *Q. Prinus*, L., var. *acuminata*, Mx., *Q. coccinea*, Wang., *Q. rubra*, L., and *Q. palustris*, Du Roi. I think also that I have found *Q. ilicifolia*, Wang., although of this I am not certain, as according to Gray it grows in sandy barrens and rocky hills. These conditions are certainly lacking in this county, and yet I have a specimen that looks strangely like *Q. ilicifolia*. I was somewhat surprised to find *Q. falcata*, Mchx. missing, although perhaps the character of the

soil may account for its absence. The trees of the county in size compare favorably with those of other counties I have examined. *Fagus ferruginea*, *Liriodendron Tulipifera*, and *Platanus occidentalis* do not attain the size here that they do in the more southern counties. But on the other hand the *Querci* far exceed their kinsmen, here becoming true monarchs of the forest. I have had no opportunities for extended measurements, yet I have on my list two of this genus with a diameter exceeding 7 feet, two exceeding 6 feet and seventeen exceeding 5 feet. A striking feature to my mind is the young growth of *Juglans nigra*, L., which of late years is springing up every where. I have not found a single instance in which it has been cultivated and yet in one case I counted in a forest not exceeding 10 acres in area, 165 representatives of this species, from 6 to 12 inches in diameter. I have noticed the same fact in Grant county. This seems a strange fact, the more so since the older growth where it occurs contains but few individuals, nor do the stumps indicate that it ever had any great predominance. I would like to know whether this has been noted in any other locality.—M. S. Coulter, *Logansport, Ind.*

The Oaks of the United States. By Dr. George Engelmann.—In this pamphlet of twenty pages read before the Academy of Science of St. Louis, March 20, 1876, Dr. Engelmann, in his usual happy style, has let a flood of light upon a very dark and perplexing genus. The Oaks, with their endless forms, have long been a puzzle and it should be a great relief to amateurs when a botanist of such acknowledged keenness of observation takes hold of the subject, and while guiding us to some extent in the straight, clear path through these intricacies, at the same time acknowledges the difficulties in the way. The author first calls attention to the "striking example of the deceptive polymorphism" of western oaks furnished by the common Rocky Mountain scrub-oak. No fewer than 4 or 5 species have been founded upon the different forms of this scrub-oak. "In herbarium specimens they all appear distinct enough, but, looking around us the very abundance of material must shake our confidence in our discrimination: within the compass of a few hundred yards we find not only the forms above distinguished, but numbers of others which are neither the one nor the other, but which are intermediate between them and clearly unite them all as forms of one single extremely polymorphous species. If one oak behaves thus, why not others? Thrown into a sea of doubt, what can guide us to a correct knowledge?" The author then takes up in detail the various features that are of use in determining the groups and species. He considers the trunk—its bark as well as its wood—and remarks that the "popular distinction of 'White-oaks' and 'Black-oaks' is based on correct observation." The leaves are then considered, principally as to their vernation and the author states it as his belief "that the characters of vernation will not only help to distinguish allied species or doubtful varieties, but will also assist in unravelling the intricate questions of hybridity." The male flowers, female flowers and fruit are spoken of in turn with their importance for furnishing valuable characters to distinguish the groups and species. In conclusion the author observes that our oaks, leaving out the very peculiar Californian *Q. densiflora*, "arrange themselves into two great groups, alluded to above as the White-oaks and Black-oaks.

The *White-oaks* are characterized by paler, often scaly bark, tougher and denser wood, and sessile or subsessile stigmas, and bear the abortive ovules at the base or rarely on the side of the perfect seed. Besides this, the leaves and their lobes or teeth are obtuse, never bristle-pointed, though sometimes spinous-tipped; their stamens are more numerous, the scales of the cup more or less knobby at base, the inner surface of the nut glabrous or (rarely) pubescent; the fruit generally matures in the first year.

The *Black-oaks* have dark, furrowed bark, brittle and porous wood, styles long and spreading or recurved, abortive ovules always near the tip of the perfect seed. The leaves and their lobes are bristle-pointed, at least in youth; lobes and teeth

acute; teeth sometimes spinous. Their stamens are usually less numerous, the scales of their cup membranaceous, the inner surface of their nut always tomentose; the fruit generally matures in the second year."

Then follow some notes upon our 19 species, including their range and synonomy. The pamphlet closes with the consideration of "Hybrid Oaks." The author says that White-oaks and Black-oaks are too distinct to hybridize with one another, and that thus far no hybrids have been discovered among the former, while among the Black-oaks he finds six forms. Four of these hybrids have been found in the Mississippi Valley and two in South Carolina. The four western hybrids all claim *Q. imbricaria* as one of the parents and *Q. coccinea*, *Q. rubra*, *Q. palustris*, *Q. nigra* as belonging in turn to each hybrid as the other parent. The two southeastern hybrids claim *Q. cinerea* as one parent and *Q. Catesbæi* or *Q. falcata* as the other.—Ed.

Notes on Agave. By Geo. Engelmann, M. D.—The plants of this genus are so difficult of preservation that very scanty and unsatisfactory material has been furnished botanists for study. Within the last few years, however, a quantity of new material has been placed in the hands of Dr. Engelmann and the result is a monograph on the genus *Agave*. The author states that the native country of the Agaves is America, and especially Mexico. He then proceeds to an enumeration of the species of the territory of the United States. The genus is divided into three sections, *Singuliflorœ*, *Geminiflorœ*, and *Paniculatœ*, the last being the typical Agaves. The section *Singuliflorœ* contains 3 species. *A. maculosa*, Hook., *A. Virginica*, L., the only representative of the genus known in the old United States, and *A. variegata*, Jacobi. The section *Geminiflorœ* contains 5 species, *A. falcata*, Engelm., *A. Schottii*, Engelm., *A. parviflora*, Torr., *A. heteracantha*, Zucc., and *A. Mathensis*, Engelm. The section *Paniculatœ* contains 8 species, *A. Newberryi*, Engelm., *A. deserti*, Engelm., *A. Parryi*, Engelm., *A. Antillarum*, Descourt, *A. Shawii*, Engelm., *A. rigida*, Mill., *A. Palmeri*, Engelm., and *A. Wislizeni*, Engelm. Accompanying the monograph are three photographic views of *A. Shawii*.—Ed.

Magnolia acuminata, L. (Cucumber-tree.)—This beautiful species is found growing within two miles of Hanover, and is one of the handsomest trees in the county. It is of very rare occurrence here, but where it has started seems to grow in clumps of considerable size. The trees are not as large as those reported from farther south, but they are of most perfect shape. The farmer who reported them growing on his farm, described them to me as being almost perfectly "egg-shaped." He afterwards brought me a large number of the branches with the fruit on them. The leaves are a beautiful ovate and not much acuminate, five to ten inches long, green above, whitish pubescent beneath. I was surprised at the size and shape of the fruit. All descriptions to which I have access gave me the idea of a small *cone* of fruit, two or three inches long. The fruit I have is nothing of the sort. I can not see a cone in all of it, or anything approaching cone-shape. No two specimens are alike. They assume all sorts of fanciful shapes and seem to vie with each other in irregularity. There are boots and crescents and clubs and knotted cudgels and nameless shapes. These shapes are controlled by the ripening of the seeds. Certain seeds will outstrip the others in growth and the consequence is a swelling on their side of the fruit. The boot-shape seems the most common and is always brought about by the ripening of two seeds, one in the apex and one in the base of the cone, and these parts enlarging excessively, and the other parts remaining *in statu quo*, form the toe and heel of the boot. All the fruits are lumpy and every lump contains a ripening seed. In my specimens I have never found more than 5 or 6 seeds ripening. The fruits, instead of being only 2—3 inches long, are 2—5 inches long, the largest always being found at the top of the tree. When they have turned a dark red, split open, and the seeds hang out on long threads, the trees present a strange and beautiful appearance. In drying, the red fruit becomes perfectly black.—Ed.

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PLANTAGO LANCEOLATA, L.—I have been watching, for some weeks past, a plant of common Ribwort, (*Plantago lanceolata*. L. which has interested me very much. The styles made their appearance, as is the habit of this genus, and seemed to be quite long for the species. After a time they began to bend down so that the stigma entered the tube of the corolla. and soon the whole style was coiled up in the corolla tube, remaining there for a day or more, in some instances, when it resumed its erect position. I then commenced to watch for the appearance of the stamens, but none made their appearance. As this seemed singular, I made close examination of the blossoms, to find stamens or anthers, for I could not imagine why the styles bent down into the corolla unless there were anthers present. But though I examined scores I failed to detect any sign of stamen or anther, except in a few instances a ligulate appendage was found in the place of the stamen, perhaps it might be considered a petaloid filament, but not the least sign of an anther was to be found.

Some of the spikes are quite well fertilized, which is not strange, some only partially so, and on some there is only one fertile ovary. This singular behavior of the styles has been in operation for weeks, going on in succession from the base to the summit of the spikes, so that very frequently on the same spike may be seen the coiled styles, below them those that have been coiled up but have become straight again, above them those that are developing, making, on the whole, a singular spectacle. Now what principle of instinct. or "natural selection" operated here? For evidently the stigmas were seeking after something that had not been supplied in the ordinary manner. I have watched many other plants of this species but none others have been found showing such variations, or any out of the usual line of development.

Have found a large number of spikes of the common plantain with leaves on the scape just below the flowers, many with branches as well as leaves, and quite a number with double spikes. In some specimens the spikes were very much divided, having as many as eight or ten branches.—N. COLEMAN, *Bloomfield, Conn.*

A REMARKABLE CHERRY TREE.—Mr. Wm. Ellis, of Gilead, Tolland Co., in this State, has a most remarkable cherry tree on his place. The tree is about ten inches in diameter, quite thrifty, and has for several years in succession borne two kinds of cherries, both choice fruit, one a light colored early cherry, the other a dark cherry that does not ripen till some time after the others are gone. The later kind does not blossom till some time after the others, and what seems a singular feature of this most singular freak of nature, the clusters of buds come out right by the side of the green cherries, and this is not confined to one branch or to one side of the tree, but is on all the branches all over the tree. Can not state the variety of the original stock, but am told great pains were taken in the grafting. If such a thing were possible one might imagine it the old stock asserting its rights through the new one's branches. Can you give any explanation of the phenomenon, or do you know of any like example?—N. COLEMAN.

All communications addressed to John M. Coulter, Hanover, Ind.

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Variation in Leaves.—On reading Dr. Engelmann's recent exeellent publication on the Oaks of the United States, I was more than ever impressed with the uncertainty of specific characters, based on the lobing of leaves. Probably no order has as much variety in this respect as *Cupuliferæ*. I have repeatedly examined both divisions, the white oaks and the black oaks, and both have alike this tendency. In a recent visit to the nurseries of Mr. Meehan, near Germantown, Pa., where seedling oaks of many species are growing in great abundance, I found it almost an impossibility to get two of the same shape. He has *Q. aquatica* by the thousand, with leaves varying from almost linear, that could scarcely be distinguished from *Q. Phellos*, to lobed, much like our *Q. nigra*, and all the intermediate forms; and, too, all of them very unlike the mature leaves of *Q. aquatica* I have seen from the south. *Q. heterophylla*, of which some fine specimens have been detected near Woodbury, N. J., possesses this same tendency to change shape, some indeed coming near that of *Q. falcata*.

I remember collecting at Byberry, Pa., some fifteen years ago, leaves from a small shrub that were very curiously shaped, indeed, I could not determine it at all. Much to my surprise, a year or two afterward, it turned out to be *Morus rubra*. Thus it appears that the leaves on young plants are often very dissimilar to those on old or mature ones.

Some time ago I examined the *Sagittaria variabilis*, common along our river shores, and found the leaves in great variation, from acute to obtuse; long taper pointed to short and blunt; long, narrow lobes to broad, wide spreading ones; some with one lobe, others with none; the leaf stalk from a few inches in length to three feet; and all growing promiscuously in a space not more than twenty yards in diameter.

The *Onoclea sensibilis*, also presents a great variety of forms. In some fronds the shape is nearly that of an equilateral triangle; in others longer and tapering to a point; whilst in others with a very broad base. The pinnæ also, are sometimes nearly entire, or crenately notched, and pass through intermediate forms almost to pinnatifid, the lobes also being acute or obtuse. In September, 1875, I collected near Germantown, Pa., the var. *obtusilobata*, a very peculiar form, with the fruit dots quite conspicuous on the under surface, without the pinnæ losing their foliaceous character. The plant from which the figure of *O. obtusilobata*, Schkuhr, was taken, I learn from Prof. Gray, was possibly found near Lancaster, Pa.

The most wonderful example, however, that I have met with was in a specimen of *Verbascum Thapsus*, recently observed growing along a railroad in what is familiarly known as the "neck," below Philadelphia. There was but a single plant, and this its first year, consequently had only the radical leaves, but every one was *lobed* or *cut-toothed* in a curious manner. Some of the leaves measured twenty-two inches in length and from four to six in width, and the margins, besides being lobed were very wavy, even those from the center, that were just beginning to unfold, having the same peculiarity. It will be interesting to know whether the flowering stalk of next year, will develop in the same manner. *Lappa major*, is said to have been found sporting in this way, but I have never so met with it.—Isaac C. Martindale, *Camden, N. J.*

Curious manner of Verbena urticifolia in discharging the corolla.—After giving the plant a little jar, in about one and a half to two minutes the flowers will be seen to fall fast. Upon minute examination with a pocket lens the corolla will be seen to be moving out from the calyx (that embraces it closely) very slowly at first, but soon quite fast and is pushed until it is quite free from it and falls to the ground. By the action of what organs this is accomplished I have been unable to discover, but probably by the straightening of the bent tube of the corolla itself, or some contracting movement of the calyx lobes. Now is a good time to observe the phenomenon. Will some botanist of leisure investigate and report

facts in the BOTANICAL GAZETTE. I have had opportunity to make no observations on other species of the genus for similar habits.—E. HALL, *Athens, Ill.*

CONOBEA MULTIFIDA, Benth.—Some time ago the Editor received for determination a plant from Mr. David Jones, of Kirkville, Ind. Without noticing anything peculiar about it he at once pronounced it *Conobea multifida*, and returned the name to Mr. Jones. The latter, however, was not satisfied and called the Editor's attention to some peculiarities which do not prevent it being *C. multifida*, but which nevertheless are very unusual and contrary to the accepted description. Nearly all the leaves are in *whorls of threes*, instead of being opposite and this peculiarity does not run simply through a single specimen, but through a whole patch. *Conobea* grows very abundantly here, but this arrangement of the leaves has not been noticed. The other peculiarity to which Mr. Jones calls attention has long been noted here and is in fact very constant. The flowers instead of being "greenish-white," are *purple* or *blue*. Such observations are of special interest because they cause slight modifications of specific descriptions and thus bring them nearer perfect accuracy.—ED.

OPUNTIA VULGARIS AND RAFINESQUII.—At a recent meeting of the Academy of Natural Sciences of Philadelphia, Mr. Isaac C. Martindale, of Camden, N. J., made some remarks upon the occurrence of the genus *Opuntia* in New Jersey. In the last edition of Gray's Manual three species are given; *O. vulgaris*, Mill., with its old range of "Massachusetts, southward, usually near the coast;" *O. Rafinesquii*, Engelm., "Wisconsin to Kentucky and westward;" and the western *O. Missouriensis*, DC. occurring in the borders of Wisconsin. Mr. Martindale proceeded to state that Dr. Geo. Engelmann in a recent examination of the genus, after comparing specimens from Massachusetts, New York, Pennsylvania and New Jersey, heretofore classed as *O. vulgaris*, determines them to be identical with *O. Rafinesquii*, and states that he has *O. vulgaris* only from the "Falls of the Potomac and South Carolina." Last June, Mr. Martindale collected near Haddonfield, N. J., specimens of *Opuntia*, which he determined to be *O. vulgaris*. Dr. Engelmann also pronounced it to be the true *O. vulgaris*. Mr. M. then made some interesting observations on the characters of the two species. He states that *O. vulgaris* has a pale green appearance, the flat joints obovate, with small ovate subulate leaves, stout and tapering from a broadish base, mostly less than one-fourth of an inch in length, and appressed to the joint, with a fascicle of minutely barbed bristles, and occasionally a spine in their axils; the flowers are sulphur yellow, the fruit smoothish, about an inch in length and half an inch in thickness, somewhat ventricose, or largest just above the middle and tapering to the base, with a depression at the top where the flower has fallen off, from one-eighth to one-quarter of an inch in depth. *Opuntia Rafinesquii* has rather larger flowers, occasionally with a reddish centre, more numerous petals, the fruit fully one and a half inches in length, with an elongated base, the depression in the top in the specimens examined not so deep as in *O. vulgaris;* the older joints have a darker green appearance, the leaves more slender, longer, from one quarter to three eighths of an inch in length, and spreading, and more frequently with the large spine, particularly about the top of joint. Mr. M. was contending not so much for the distinctness of the two species, as that if they are distinct they are both growing in New Jersey.—ED.

NOTES ON ACNIDA.—In the August number of the American Naturalist Dr. Gray has given a very interesting account of the genus *Acnida* and the confusion of its species. In the second edition of Gray's Manual of Botany we have but the Linnæan species, *A. cannabina*, and the section *Montelia* (under *Acnida*) of Moquin-Tandon set up as a genus. In the present note Dr. Gray says it was a sad oversight, "having confounded Moquin's *Montelia*, which has a small and indehiscent utricle, with his own *M. tamariscina*, the utricle of which dehisces transversely, and which likewise has far more slender fertile inflorescence." The object of the

present article is not only to correct this mistake but to direct the attention of all botanists, especially those near the seaboard, to the species of *Acnida*. The request is made that specimens be critically examined while fresh and that dried specimens, especially in good fruit, also be prepared and sent to the writer. The so-called *Montelia tamariscina* has been found this summer growing in great profusion upon the banks of the Ohio river and both fertile and sterile plants were easily obtained, although the former is much later in getting itself ready for a good herbarium specimen. Although the species of most interest are not found here, the material that we have is being carefully watched. I wish to reproduce here Dr. Gray's proposed rearrangement of the genus *Acnida*, both to assist botanists in their search for the material requested, and because it makes some important changes in a puzzling family.

ACNIDA (*Acnide* Mitchell) Linn.

(1.) EUACNIDE. Utricle somewhat fleshy, indehiscent, large, *i. e.*, one and a half to two lines long.

A. RHYSSOCARPA, alias RUSOCARPA Michx. Fertile inflorescence very naked; the bracts not half the length of the fleshy utricle, the angles of which are not rarely rugose-tuberculated; stigmas comparatively short and slender-subulate. Salt marshes, New England to Georgia.

A. CANNABINA L. Fertile inflorescence slender or sometimes glomerate; utricle thinner and smaller, with acute and smooth angles, much exceeding the bracts; stigmas very long and filiform, almost plumosely hairy. Salt marshes and river-banks even beyond brackish water, New England to Georgia, West Indies (?), etc.

A. AUSTRALIS, n. sp. (*A. cannabina* Chapman, S. Flora.) Panicled spikes of the fertile inflorescence dense, linear-cylindrical; utricle smooth, thin, hardly at all fleshy, acute-angled, little if at all exceeding the imbricated bracts; stigmas setaceous, rather short. Florida, at Apalachicola, Dr. Chapman; Biscayan Bay, Dr. Palmer, coll. no. 462.

(2.) MONTELIA Moquin-Tandon. Utricle thin and small (half to two-thirds of a line long), punctate-rugose or roughish, indehiscent, equaled or exceeded by the cuspidate-tipped bracts; stigmas slender, filiform, almost plumosely hairy.

A. TUBERCULATA Moquin-Tandon, in DC. Prodr. *A. rusocarpa* Moquin-Tandon, l. c., not of Michx. *A. cannabina* var. *concatenata* Moquin-Tandon, l. c. *Amarantus Miamensis* Riddell, synopsis. *Montelia tamariscina* Gray, Man., Bot. ed. 2, 370, and ed. 5, 413, partly, especially the var. *concatenata*. River-banks, shores, etc., in the interior. Lake Champlain to Iowa and Texas. Sometimes erect, and from one to four feet high, sometimes spreading or prostrate in sandy or gravelly soil.

(3.) PYXIDI-MONTELIA. Utricle thin and small, shorter than the cuspidate-tipped bracts, circumscissile in the manner of true *Amarantus;* fertile inflorescence in slender virgate paniculate spikes, less glomerate than in the preceding; stigmas similar or shorter.

A. TAMARISCINA. *Amarantus tamariscina* Nutt., in Trans. Am. Phil. Soc., n. ser., v. 165. *Montelia tamariscina* Gray, l. c., in part. Arkansas to Texas and New Mexico.—ED.

SOME NEW ROADSIDE PLANTS.—It is always interesting to watch the river banks and roadsides, for new species are very apt to be found in such localities. This season several species new to our county flora were found along the roadsides, and they were all on their way from the western plains to the east. Last year a very small patch of *Artemisia biennis* was noted, and this year a road southwest of the town is lined with thousands of specimens. *Euphorbia marginata* has come in the same way, until now it is quite at home. *Erigeron divaricatum* was found this year for the first time and it was evidently a late arrival. It was quite abundant, growing with *Verbena bracteosa* and *V. officinalis*. At a hasty glance it is very apt to be passed by for depauperate forms of *E. Canadense*, and probably has been passed by in that very way, but when once intelligently seen is very readily distinguished, even in riding by.—ED.

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CALANDRINIA LEANA, n. sp.—Smooth: leaves all radical, thick and succulent, oblanceolate, obtuse, 1—1½ inches long; scapes several from a thickened root, erect, 6 to 8 inches high, furnished above the middle and at the bases of the peduncles with small, ovate, scarious, glandular-denticulate bracts; inflorescence corymbose; sepals 2, orbicular, scarious, glandular-denticulate at the terminations of the veins, 1½ lines in length and breadth; petals 5 to 7, cuneate-obovate, retuse or emarginate, bright red, 6 lines long; stamens 5 to 7, shorter than the petals; style 2½ lines long; ovary of the same length, ovoid; ovules 2 to 10; seeds black, shining, estrophiolate. The whole plant is more or less reddish, and resembles *Spraguea umbellata* in its general habit. It is named for Mr. L. W. Lee, who collected it, August 2d, 1876, on the Siskiyou Mountains, near the southern boundary of Oregon.—THOS. C. PORTER.

A VALUABLE LIBRARY FOR SALE.—The Library of the French Botanist, Adolphe Brongniart, is to be sold by auction in Paris on the 4th of December next, and the succeeding days. The Catalogue makes a duodecimo volume of two hundred and forty pages. The botanical portion is of course the richest and fills a hundred and seventy-four pages, comprising all departments of the science. The department of fossil plants is especially full, and, as the prefatory note remarks, would make a library by itself, and is almost complete. M. Brongniart was the creator of vegetable palæontology, and to the end of his life devoted himself to collecting all that was published on this subject, small and great. Besides this the library contains many important works on vegetable anatomy, and many very rare pamphlets, and papers published in the proceedings of learned societies. The books are subject to an addition of 5 per cent. to the price for the expenses of the sale, and an additional 5 per cent. to the agent, M. E. Deyrolle, fils, 23 rue de la Monnaie, Paris, of whom we presume catalogues may be procured by any one desiring them.—W.

FERNS AT THE CENTENNIAL.—The Hawaiian department at the Centennial Exhibition contains several sets of the Ferns of the Islands, which are very beautiful, and comprise over a hundred different species. They would be a desirable acquisition for a collector of Ferns, but the prices set upon them are altogether too high. Thirty dollars for a hundred specimens of small Ferns, and from that up to seventy-five dollars and more for large ones, is altogether out of proportion to the usual commercial price of *Exsiccati*. Thus Norrlin's collection of Lapland lichens, embracing 300 species, is furnished for thirty dollars, and the labor and expense of collecting plants in that arctic region must be much greater than in the tropical islands.—W.

SOME NOTES FROM MILWAUKEE.—From a private letter of Dr. J. S. Douglas to the Editor, the following notes are of general interest: "Have you discovered any rays in the *Aster augustus*? It is new in this region, having first appeared here two years ago, but is now abundant, but I have never been able to discover any rays. The introduction of new plants in a locality is curious. For example, I

All communications addressed to John M. Coulter, Hanover, Ind.

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have inquired for twenty years for the familiar eastern *Erechthites hieracifolius*, but no botanist or farmer had ever seen it in this State. Two years ago Dr. Lapham asserted that it had never reached Wisconsin. A week afterwards I discovered it for the first time in a door-yard adjoining my office. A few days later I found it in considerable abundance along the Wisconsin Central R. R., north of Steven's Point.

A friend just informs me that he has found the *Lobelia syphilitica* perfectly white, growing with the blue. Is this a new departure?"

Some Variations.—There are some strange varieties of a few plants growing in this vicinity, which I thought might prove to be interesting to the readers of the Botanical Bulletin. *Caltha palustris*, L., found flowering in meadows from the latter part of March to May, varies in its flower considerably. The sepals, not unfrequently, instead of numbering 5 to 9, as descriptions in books state, become as numerous as 13 to 15 and less than half as wide as usual and spatulate in form. I collected a remarkable flower of this plant, several years ago, in which the sepals, 13 in number, are disposed in two whorls. The lower whorl is about half an inch beneath the upper, consists of 10 sepals, spatulate, generally entire, a few triply crenate at their somewhat widened apex, and the venation closer than usual. The apex of the peduncle, bearing the stamens and pistils, is surrounded by two small and one large sepal. Probably this form is merely a monstrosity, yet it is interesting to note the tendency in this plant to produce a greater number of sepals than is noted in botanical works. I have not collected any of the above forms in seed, therefore am unable to state whether further variation might be found in the follicles and seed.

Camptosorus rhizophyllus, Link., is one of our most interesting and abundant ferns, growing luxuriantly on damp shaded limestone rocks. The auricles of the fronds vary in shape considerably; in some forms almost absent, with scarcely an enlarged base, to largely auricled and hastate, the slender prolongation growing from the latter forms often rooting and producing new plants. The frond is sometimes found bifid, the divisions spreading at about half its length, each portion bearing a midrib and terminating in a very slender apex. I have found some plants bearing sori, in which the frond is remarkably short, oblong, obtuse, widening at the base into obtuse auricles. Again I have another form in which the auricles are so deeply cleft from the main frond, as nearly to form three distinct divisions.—E. A. Rau, *Bethlehem, Pa.*

Botany of the Geological and Natural History Survey of Minnesota.—The Regents of the University of Minnesota have taken action ordering the commencement of a thorough and systematic examination of the flora of the State. To facilitate such an examination Prof. N. H. Winchell, chief of the Survey, has issued a circular letter to the botanists of the state, giving them directions how to proceed to work systematically. As Minnesota is beyond the range of ordinary text books, the books necessary for working up the flora are expensive and some of them hard to get, and of course by centralizing all their forces at the University, a much greater and more satisfactory kind of work can be done. Such a survey ought to be ordered in every State. There are geological surveys enough to work up every corner of every state, but botanical observations on any part of a state must creep in by special favor. Our public spirited legislators, who can see the point of voting appropriations for opening up their coal fields and iron regions, have not been educated sufficiently yet to know the economic value of a good botanical survey or that a geological survey cannot be complete without it. But botanists *will* work whether they have appropriations or not, and though it is necessarily a slower process, the work will be done eventually, and may be all the better for its slow and careful progress.—Ed.

Recent Periodicals.—*American Journal of Science and Arts*, September. A pa-

per on "The Structure and Movements of the Leaves of *Dionæa muscipula*," by Casimir De Candolle, is reviewed by Dr. Gray. M. De Candolle, from a series of experiments, comes to the conclusion that animal matter is not necessary to the growth and strength of *Dionæa*. He further infers that the animal matter of the insects caught is not directly utilized by the leaves, a conclusion which Dr. Gray does not consider necessary. A new intoxicating grass from Mongolia is noticed. "It proves to be a new species of *Stipa*, brought from the Alachan mountains by a Roman Catholic Missionary, whose horses were disabled by its inebriating properties. The wandering Mongols of the region are familiar with this grass, and use vinegar as an antidote." M. Alph. De Candolle has caused a series of observations to be made in two old botanical gardens, in Paris and Pisa, to learn whether the age of a tree influences its time of leafing. The results do not show that there is any difference in this respect due to age.

American Naturalist, September. The doubtful species, *Schœnolirion album* Durand, referred to in the July number, has been rediscovered in Plumas County, California. *Sedum reflexum*, L., is reported to have established itself at Pigeon Cove, Essex County, Mass. A new Rocky Mountain fir is described by Lester F. Ward under the name of *Abies subalpina*, a provisional name given to the species by Dr. Engelmann as the "fir which occupies the highest wooded regions up to the limits of vegetation in the Rocky Mountains, from Colorado northward and westward to Oregon."

Bulletin of the Torrey Botanical Club, July and August. A large part of this double number is devoted to the notice and brief review of recent publications. An interesting letter from Mr. Hall, of Beirut, is given. Quite a number of additions and corrections are made to the Botanical Directory, Supplement, 1876.

Home and School, John P. Morton, Louisville, Ky., September. Mr. John Williamson presents his third paper upon "Studies in Nature and Art." Mr. W. has commenced operations in a new and very interesting field. He is both botanist and artist, and studying the beautiful forms suggested by flowers, works them into ornamental designs. In each paper he has presented a single species, gives a minute and popular description of it, accompanied by a wood cut, and then gives in another plate some idea of the ornamentations to be derived from it. In the August number he took up *Jeffersonia diphylla*, and in the present number *Hepatica triloba*. Mr. W. was kind enough to furnish us with an advanced sheet of the cut to be used in the October number. It is a very accurate drawing of that rare and beautiful fern *Trichomanes radicans*, made from growing specimens.

Field and Forest, Washington, D. C., September. The botanical articles are "Field Notes in New England," by J. W. Chickering, Jr., "Flora Columbiana," taking us to *Gentianaceæ*, and a note on the "Catalpa, or Cigar Tree," by S. S. Rathvon. This sprightly journal has recently doubled its size to sixteen pages and is well worth the subscription price, one dollar. Address Editor Field and Forest, P. O. Box 273, Washington, D. C.

Some River Bank Flowers.—One of the best botanical grounds in this region at the present season is the bank of the Ohio River. Every year the river overflows its banks and deposits not only a coating of rich alluvium, but also seeds brought from farther up stream and new to our flora. Nearly every season reveals something new, and although it is, of course, not equal to the ballast grounds of sea-port towns it is interesting in somewhat the same way. Through September the bank is very rankly overgrown and it is with great difficulty that one can force his way through the jungles of herbs that have assumed forest like proportions in this rich soil. It might be interesting to mention some few of the more striking plants noted in an afternoon's walk. To get to the river bank necessitates passing through a jungle of *Ambrosia trifida*, not eighteen feet, as noticed once before, but in some instances *twenty-two feet in height*. On coming to the beach we find it one continuous carpet of *Eragrostis*, principally *E. poæoides*, var. *megastachya*

and *E. reptans*. Among it can be seen coming up now and then a stalk of the fragrant *Pluchea fœtida*, quite an abundance of *Heliophytum Indicum*, plenty of *Conobea multifida*, with leaves in whorls of three and purplish flowers, an occasional *Kyllingia pumila*, which grows in such abundance back from the river on what are known as "The Flats," huge specimens of *Eclipta procumbens* which look very much overgrown, and *Chenopods* of various species. In some parts of the bank where *Eragrostis* has not taken such a decided hold may be found growing large clumps of *Baptisia australis* and *Polanisia graveolens*, *Cuscuta Gronovii* growing over whatever it can, *Apocynum cannabinum* with its very long follicles, *Artemisia biennis*, and *Polygonum dumetorum*. There is a wonderful growth of *Tecoma radicans* and *Phaseolus diversifolius*. These two species seem to be running a race to see which can cover the most bank in the shortest time. The latter grows partly on what may be called the beach, and in that situation holds full, undivided sway, but where the bank becomes abrupt and broken the fight commences. They have made a clean sweep of everything in the way. Poor *Enslenia albida*, that was blooming so abundantly there earlier in the season, was destroyed root and branch, not even being permitted to ripen pods and provide for a future generation. In some places the banks are yellow with *Helianthus doronicoides* growing from one foot to twelve and having as many specimens with alternate leaves as opposite. I can but mention the jungle like growth of *Polygonum Pennsylvanicum*, which rises fully six feet from the ground and is a very formidable obstacle in one's pathway. Its thick, bold-looking, upright spikes are placed in striking contrast with the lighter colored, gracefully drooping spikes of the more slender *P. incarnatum*. Then there is *Coreopsis trichosperma* and four species of *Bidens*, viz: *B. chrysanthemoides* from one inch to three feet, *B. frondosa*, *B. connata* and *B bipinnata;* also *Montelia tamariscina*, *Ipomœa lacunosa* twining around everything, *Phelipœa Ludoviciana* under the shade of the huge *Ambrosia*, *Hibiscus militaris*, *Cyperus strigosus*, *phymatodes*, and probably *Michauxianus*, *Eupatorium perfoliatum* and *serotinum*, clumps of *Vilfa vaginæflora*, and patches of *Panicum capillare* to be waded through up to the breast. *Artemisia Abrotanum* is growing there in profusion.—Ed.

It is with a feeling of regret that with this number we bid farewell to the Botanical Bulletin. The name has become so much associated with the paper that for a time the new name will sound strange, but we hope that the Botanical Gazette will fulfill the mission of the Bulletin in a much more satisfactory manner. Its increased size will permit a greater variety of articles than heretofore and papers of considerable length will be published in addition to the short notes that were necessary in so limited a space. It was with no thought of infringing upon the name of the *Bulletin of the Torrey Botanical Club*, that the name for volume first was selected, but as many have feared some confusion might arise, we have cheerfully withdrawn our claim and have selected a name which, we are assured by an accomplished scholar and botanist, "means about the same thing." We take this opportunity of expressing our warmest thanks to our friends and patrons, who have so promptly and cordially seconded our efforts. A paper in which not a line of advertisement appears to aid in its support needs to have a comparatively large subscription list, and it was with considerable trepidation that the undertaking was commenced. But the kind assurances of our friends have encouraged us to incur additional expense in the hope of giving subscribers a sheet of more satisfactory size, and one which can contain a greater variety of matter. With the last number of Vol. II a complete index to Vol. I and II will be issued and the pages of the two volumes will be numbered consecutively. With these words we place a completed volume of the Bulletin in our readers' hands, and express the hope that in its new dress and enlarged capacity the Gazette will prove much more attractive and profitable to all interested in the study of botany.—Ed.

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BOTANICAL GAZETTE.

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NOTES ON FESTUCA THURBERI.—Among the botanical collections of the Expedition of Lieutenant Wheeler, in 1873, made in Colorado, was a *Festuca*, which the writer described and published as *Festuca Thurberi*. The specimens were in a young, undeveloped condition, which prevented the recognition of their identity with the so-called *Festuca scabrella* of that region of country. Some time afterwards Prof. Porter sent specimens which made the connection clear. Still, as the grass in question had been referred to *Festuca scabrella* with some doubt, the writer entered into a critical investigation of the same, and became satisfied that it was not the plant described by Hooker in the Fl. Bor. Am. The plant described and figured in that work by Dr. Hooker was collected in the Rocky Mountains by Drummond, and referred to *F. scabrella*, Torr. Mss. Whether the species was ever published by Dr. Torrey we have not been able to learn. Not having access to the original specimens upon which Dr. Torrey founded his species, nor to those of Dr. Hooker, I could only compare the description given by Dr. Hooker and his figure with the specimens of the grass from Colorado which has been distributed in several collections as *Festuca scabrella*, or what I described as *Festuca Thurberi*. It seems hardly possible to connect the two descriptions, and the conclusion is, therefore, that there are two species under consideration. If, therefore, Dr. Hooker's plant be correctly referred to *Festuca scabrella*, the name *Festuca Thurberi* will still apply to the grass from Colorado and other portions of the Rocky Mountains. A *Festuca* from California has been distributed as *F. scabrella*. One also occurs under that name in Mr. E. Hall's collection of Oregon plants. The specimens of these plants which have come under my observation are certainly different from the one which I have described from Colorado. Whether they are the plant of Hooker's Flora or not, I will not now undertake to decide. I append an abstract of contrasted characters of the two grasses under discussion, those of *F. scabrella* drawn from the description in Hooker's Fl. Bor. Am., and those of *F. Thurberi* from Colorado specimens.

Festuca scabrella.—Culm 1 ft. high, erect, cæspitose, smooth, striate, chiefly one-leaved; leaves narrowly linear, acuminate, scarcely 2 inches long, vagina very long (under the lens scabrous); the remaining leaves also glabrous, mostly radical, with membranous sheaths, narrowly linear, 3–4 inches long, soon deciduous from the sheath; panicle compound, 3–4 inches, erect, branches spreading, toward the apex spicate; spikelets greenish-purple, 3–4 flowered, ovate, ¾ inches long, to the tocuh, or under the glass, minutely scabrous; glumes unequal, acute, almost twice shorter than the flowers, nerveless, without awns; flowers terete, outer valve 5-nerved, extended into a very short beard, inner valve lanceolate, flat, margin inflexed, scabrous at the flexules.

Festuca Thurberi.—Culm 2–2½ feet high, erect, cæspitose, not conspicuously striate, 2–4 leaved; leaves rigid, involute, 6 inches long, scabrous; radical leaves numerous, involute, rigid, 1–1½ ft. long, very scabrous on the margin, sheaths somewhat membranous, blade deciduous when old; panicle compound, 3–5 inches, a little drooping, 4–5 joints, branches slender, spreading when ripe, single or in pairs, branching below the middle; spikelets purplish, oblong-lanceolate (or cylindrical when young), wedge-shaped when expanded, 3–5-flowered, 5–6 lines long, slightly scabrous under the lens; glumes thin, membranaceous, shorter than the flowers, of nearly equal length, obtuse, or the lower ones acutish, the upper ones convex, not compressed, obscurely nerved, lower ones slightly keeled; flowers cylindrical, convex (not compressed), outer palet obscurely 5-nerved, lanceolate, acute or short cuspidate, minutely scabrous; inner palet narrow, slightly hispid on the keels.

GEO. VASEY.

FLOWERS AND FERNS OF THE DELLS OF THE WISCONSIN.—The collections of Parry, who accompanied David Dale Owen in his geological reconnoisance of the Upper Mississippi and its tributaries, indicated that there were in Central Wisconsin, besides the local flora, plants of the Atlantic Coast—since extended botanically to the beaches of the Great Lakes—of the Southern States and of the far Northwest. The indefatigable labors of the lamented T. J. Hale and Dr. I. A. Lapham have confirmed the supposition in a general way, so far as it relates to the larger rivers of Wisconsin flowing westward. During the summer just passed we spent two weeks on and near the Dells of the Wisconsin, and while the principal object of our visit was not botanical, we believe our notes have sufficent interest to collectors elsewhere to repay the trouble of editing them. We have aimed at completeness only with the ferns, attempting further to give only a good idea of the characteristic vegetation. The time of our visit was August.

FLOWERS.—1. *Corydalis glauca*, Pursh. Common enough on the more exposed rock, but never found by us on the limestone in Southern Wisconsin, where we have collected for several years.

2. *Arabis petræa*, Lam. Very common, growing with *Sullivantia* on most shaded rocks.

3. *Hudsonia tomentosa*, Nutt. Near the railroad bridge at Kilbourn City. Nearly smooth and few-flowered stems.

4. *Mollugo verticillata*, L. So thoroughly established everywhere that it is difficult to believe it an immigrant.

5. *Talinum teretifolium*, Pursh. A large patch on the sand back of Allen's House. Our specimens nearly destroyed by growth in the portable press. With it, in abundance, was the fungus *Geaster hygrometricus*, Pers.

6. *Potentilla fruticosa*, L. Grows everywhere on the rock at the Dells, sometimes fifty feet above the water.

7. *Rubus* species, *triflorus*, Richardson; *strigosus*, Michx.; *occidentalis*, L; *villosus*, Ait.; *Canadensis*, L. All common. Blackberries were worth only $1.25 per bushel.

8. *Sullivantia Ohionis*, Torr. and Gray. Quite common, especially in the side glens.

9. *Heuchera hispida*, Pursh., is also very common on the moist rocks, and was in blossom, while the smoother plants of the prairies south had been in fruit for several weeks.

10. *Hamamelis Virginica*, L. Common.

11. *Aralia hispida*, Michx. A large patch in fruit on the rock over the Cave of the Dark Waters.

12. *Linnæa borealis*, Gronov. Only seen in the woods at Gates' Ravine.

13. *Campanula rotundifolia*, L. Common.

14. *Gaylussacia resinosa*, Torr. and Gray. Very common. Berries worth only $1.50 per bushel.

15. *Vaccinium Pennsylvanicum*, Lam. Very common. Berries worth only $1.00 per bushel.

16. *Epigæa repens*, L. Very common.

17. *Gaultheria procumbens*, L. Very common. This and the three preceding are also found in Southern Wisconsin wherever there is any considerable outcrop of sandstone, such places being known in all the regions around as Wintergreen Hills, etc.

18. *Chimaphila umbellata*, Nutt. Very common. Plants here indicate a very close approximation of "cold, damp" and "dry" woods.

19. *Verbena stricta*, Vent. Common on the sand plains near the river. *V. bracteosa*, Michx., grows everywhere with it.

20. *Monarda punctata*, L. Very common on the sand.

21. *Frælichia Floridana*, Moquin. Very abundant on the sand above Sugar Bowl.

22. *Comptonia asplenifolia*, Ait. Very common on the sand plains near Kilbourn City and on the more barren rock.

23. *Betula papyracea*, Ait. Very common.

24. *Pinus Banksiana*, Lambert. Common on the sandy plains. Known as "Jack Pine."

25. *Pinus Strobus*, L. Growing here, but the Dells are south of the "pine regions" of Wisconsin.

26. *Abies Canadensis*, Michx. Very common.

27. *Habenaria Hookeri*, Torr. Not uncommon with *Linnæa*, *Mitchella*, etc. In fruit, but the blossoms not yet fallen.

Compositæ were not at all abundant, but we notice *Liatris cylindracea*, Michx., and *Aster æstivus*, Ait., on the rock opposite Gates' Ravine.

FERNS.—1. *Polypodium vulgare*, L. Very common.

2. *Adiantum pedatum*, L. Quite common.

3. *Pteris aquilina*, L. Quite common.

4. *Pellæa atropurpurea*, Link. On Sugar Bowl, Steamboat Rock, and similar rocks. As thrifty on the sandstones as when growing on the calcareous rock of Southern Wisconsin.

5. *Asplenium Trichomanes*, L. Very common.

6. *Asplenium thelypteroides*, Michx. Not uncommon.

7. *Phegopteris Dryopteris*, Fee. Very common in the side glens.

8. *Aspidium fragrans*, Swartz. This fern, first found within the limits of the United States by Dr. Parry, is not rare on the Wisconsin.

9. *Aspidium spinulosum*, Swartz. The specimens we saved are not of the type, nor, with certainty, either of the varieties, for the scales of the stipe are entirely brown, but the lobes of the pinnules are spinulose, and not obtuse. Is not this another of the many plants where the so-called "varieties" are merely forms with individual instead of local peculiarities.

10. *Aspidium marginale*, Swartz. Very common.

11. *Cystopteris bulbifera*, Bernh. Not common.

12. *Cystopteris fragilis*, Bernh. Exceedingly common and variable.

13. *Onoclea sensibilis*, L. Not common.

14. *Woodsia Ilvensis*, R. Brown. The most common rock fern of the Dells.

15. *Osmunda regalis*, L. Common in the glens.

16. *Osmunda Claytoniana*, L. The common fern of the glens.

17. *Botrychium Virginicum*, Swartz. Common.

18. *Camptosorus rhizophyllus*, Link. This undoubtedly grows here, as we have found it on the sandstone further south.

Growing with the ferns is *Lycopodium lucidulum*, Michx.—HERBERT E. COPELAND.

THE INTRODUCTION OF FOREIGN PLANTS.—The subject of the introduction of foreign plants is one of interest to botanists in all sections of the country, and is gradually becoming more so as the geographical distribution of species is being carefully investigated. There are various ways by which this may be effected, and as it can not be told when nor how it may occur, it behooves all lovers of science to keep wide awake, carefully noting the advent of hitherto strangers in Flora's household. The agency of wind is a powerful one in this regard, particularly with respect to that large order, *Compositæ*, the seeds of many of which are furnished with a feathery pappus, and are often carried through the air long distances and deposited on the sides of high mountains, or in the depths of low fertile plains, oftimes a very different location from the usual *habitat*. The flight of birds, doubtless, furnishes one of the most powerful agencies, as their migration, especially near the coast, is sufficiently rapid to carry seeds that will germinate when a proper condition is found. In the southern counties of New Jersey

have been collected many species new to the State, but of frequent occurrence on the coast of Virginia and southward, evidently from seeds carried by birds in their flight coastwise. The importation of grass seed from the west and south has brought us many plants not before met with, and it is highly probable instances of the reverse order may have occurred. A few years ago *Rudbeckia hirta* was almost unknown in Eastern Pennsylvania, though very common throughout the Western States. Now it is to be found on every farm, giving at a distance a golden hue, in strange contrast with the silvery whiteness of the *Leucanthemum vulgare*, now excessively abundant in all our meadows and grass fields.

The large flocks of sheep brought to the Eastern market have been great distributors of those seeds which readily adhere to the wool. I have frequently been shown, in some of our city gardens, plants which have been grown from seeds sent as curiosities from distant localities by absent friends, or gathered as relics of visits to far away places. Even botanists themselves have, perhaps inadvertently, done something in this way. A few years ago I received in exchange a package of plants from Michigan, which I was compelled to allow to remain upon my table for some time before I could get them in their proper place in my herbarium. Fragments, which had become detached in transportation, were all permitted to remain until the whole transfer was complete, when the sweepings from the table, containing many seeds which had fallen were carefully planted, with the satisfaction, in due time, of duplicating some of my specimens.

The arrival, at the various seaport towns on the coast, of ships with ballast from different parts of the world, has probably done the greatest work in this introduction and distribution, and it is one which will continue so long as our country can furnish material to satisfy the wants of other nations. At the port of Philadelphia this has been on a gradual increase for several years, and, as a natural consequence, many plants have collected which probably have not been found elsewhere in the United States. Aubrey H. Smith published in the Proceedings of the Academy of Natural Sciences of Philadelphia, February, 1867, an article "On Colonies of Plants Observed near Philadelphia," the list appended embracing 106 species, most of which were collected where ballast had been deposited. The list was complete, so far as known at that time, but it is not at all unlikely the number has fully doubled since. Many species are to be found year after year, often in increasing numbers, and are therefore entitled to a place in the flora of our country. In fact, all that occur, or have occurred, though it be but for a single season, should, I think, be so placed upon record, for without doubt many of the large number of plants in Gray's Manual which have "Eu." appended have been introduced in this and similar ways, and we may reasonably expect to find, in a few years, some of these more recent arrivals going forth, ably sustaining themselves against wind and weather, to the delight, possibly to the amazement, of some future student of nature. Several species have been collected this year that have not appeared heretofore, and many of former years have not been seen thus far the present season. I will add a few that have been collected, mostly this year, in order to show what has occurred in the vicinity of Philadelphia, and which may now be occuring at other places on the coast. And I desire to call the attention of botanists to these deposits of ballast as the opening of a field at once new and interesting, and which promises good results to the attentive investigator.

Ranunculus philonotis, Ehrh. One plant only, differing from *R. bulbosus*, L., in having minute tubercles on the carpels.

Sisymbrium Sophia, Linn. Quite abundant. Has occurred for several years.

Sisymbrium Irio, Linn. Collected one plant a few years ago.

Erysimum orientale, Br. A very handsome species, not abundant, but collected on several occasions.

Brassica tenuifolia, Boiss., *B. muralis*, Boiss., *B. monensis*, Hudson, have been collected for several years. *B. tenuifolia* is very abundant this season, and seems to be spreading into the waste grounds.

Alyssum incanum, L. appeared this year for the first, in a limited quantity only.

Reseda Luteola, Linn. Quite abundant this season, and frequent in former years.

Cleome pungens, Willd. Quite abundant two years ago on river dredgings, but rather scarce this season.

Gyandropsis pentaphylla, DC. Two plants this year, collected for the first time.

Silene inflata, Sm., and *S. noctiflora*, Linn., are very common this year.

Lychnis vespertina, Sibth., and the nearly allied *L. diurna*, Sibth. The sterile and fertile plants of both species collected on several occasions.

Tribulus terrestris, L. Very abundant this year, some of the plants covering a space three feet in diameter.

Geranium molle, L. A few plants only this year. Some other species of this genus were collected also.

Erodium cicutarium, L'Her. Abundant, specimens very large.

Medicago falcata, L. Several plants growing, but not so abundant as *M. sativa*, Willd., while *M. lupulina*, L. is very common in all the waste grounds.

Melilotus parviflora, Desf. Quite abundant, as is also *M. alba*, Lam., and *M. officinalis*, Willd.

Lotus corniculatus, L. Collected last year for the first, one plant only. This year it is quite frequent. I found this species very abundant two years ago on the islands of the west coast of Scotland.

Trifolium hybridum, L., maintains itself year after year, and seems to be increasing in abundance.

Lathyrus Aphaca, L. Two plants this year, found for the first time.

Vigna glabra, Savi. Quite abundant. Did not perfect its fruit for a year or two, but does so now to full satisfaction.

Potentilla reptans, L. Fairly covers the ground in some places, but it does not incline to flower much. *P. Anserina*, L., is very abundant, appearing year after year.

Scandix Pecten, L. One plant collected this year. It has occurred before, but never many specimens.

Richardsonia scabra, St. Hil. Several plants this year, growing very luxuriantly.

Tussilago Farfara, L., has been more abundant this year than usual.

Aster flexuosus, Nutt., *Solidago sempervirens*, L., and *Pluchea camphorata*, DC., all sea coast plants, occur quite frequently. The *Solidago* this year is very robust, some of the plants being fully four feet high.

Acanthospermum xanthioides, DC. Two plants only; collected this year for the first time.

Artemisia Absinthium, L. Several fine plants this year.

Senecio Jacobæa, L., has been growing for several years, but has never flowered till the present season. Some of the specimens come very near *S. erucifolius*, L., to which it is closely allied.

Carduus pycnocephalus, Jacq. A few plants only, in two localities.

Centaurea solstitialis, L. Very scarce. Collected this year for the first time.

Helminthia echioides, Gærtn. Quite common this season. Its peculiar appearance makes it very conspicuous.

Picris hieracioides, L. One plant only, and that one became destroyed before the fruit fully ripened.

Anagallis cærulea, Sm. Quite common; scarcely less so than *A. arvensis*, L.

Plantago Coronopus, L. A few plants only.

Linaria spuria, Willd. Very abundant in two localities, also *L. Elatine*, Desf. The latter, in one locality, covered a space of fully six feet square with its running stems, in a dense mass six inches thick. I had promised myself a full suite of specimens, but on a second visit to the locality, found a ditch had been cut through, entirely destroying every vestige of the plant.

Linaria minor, Desf. Quite abundant.

Antirrhinum Orontium, L. A few plants only.

Scoparia flava, Cham. A single specimen this season. A few years ago it was very abundant.

Lycopus Europæus, L., maintains itself year after year.

Ballota nigra, L. A few plants only.

Stachys arvensis, L., and *S. sylvatica*, L. are frequent this year. Some curious forms of *S. palustris*, L., occur in the dry sand.

Heliotropium Europæum, L. Very robust and wide-spreading specimens.

Heliotropium Curassavicum, L., has frequently occurred, but have seen none this year.

Tournefortia heliotropoides, Hook. A few plants only, all of which became destroyed before the fruit fairly ripened.

Solanum sisymbriifolium, Lam. A few plants only, but they were nearly eaten by the potato bug before the fruit perfected.

Datura Metel, L. A single specimen occurred this season.

Nicotiana longiflora, Cav., has occasionally occurred in waste grounds. *N. glauca*, Graham, a few plants only. A very handsome species indeed.

Chenopodium polyspermum, L. Very abundant this year. *C. vulvaria*, L., quite common. The damp ballast ground seems to be the home for *Chenopodium*, *Amarantus* and *Atriplex* in great quantities and a variety of forms.

Salsola Kali, L., and *Atriplex arenaria*, Nutt., from the sea coast, frequently occur.

Amarantus deflexus, L. One specimen only this year.

Polygonum herniarioides, Delili, from the Mediterranean region. One plant only this season.

Several *Euphorbias* have been collected, *E. serpens*, H. B. K., occurred a few years ago, but none seen this season. *E. Peplis*, L., three specimens only. *E. Peplis*, L., *E. Helioscopia*, L., and *E. hiberna*, L., are quite frequent.

Carex muricata, L. One plant only.

Agrostis Spica-venti, L. Quite abundant this year. A very conspicuous and handsome grass when in flower.

Colium temulentum, L. Quite frequent.

Lolium temulentum, L. Quite frequent.

Holcus mollis, L. A few plants only.

Phragmites communis, Trin. In dry sand. Prof. Porter says "one of its many forms;" but it looks strange in comparison with the specimens from the Southern States.

Andropogon halepensis, Sibth. A few specimens.

Panicum miliacea, L. Quite abundant.

A great many species that are already described in Gray's Manual as introduced plants occurred abundantly both in this and former years, evidently recent importations, but I did not deem it essential to include them in this article. Many strange looking plants have appeared, that have never flowered, hence could not be determined, and some biennials have appeared this year that may flower next, if the winter be not too severe. It would be interesting to know if ballast deposited at other places produces the same kind of plants.—Isaac C. Martindale, *Camden, N. J. September* 21, 1876.

P. S.—Since the above was written I collected, near the Wissahickon Station, on the Philadelphia & Reading railroad, about four miles from Philadelphia, *Leonurus glaucescens*, Bunge. This plant is from Northern Asia, and how it could get into the above locality is somewhat of a mystery, as no ballast material has been transported to that neighborhood, and it is not a garden plant, in this country, at least; it is possible, however, that the seeds may have been introduced among the exhibits to the Centennial Exposition, by way of Japan. It is very abundant this year, in the locality above mentioned, and the seeds have fully ripened, but it remains to be seen whether it will reproduce itself another year or not.—I. C. M.

NOTES ON THE TILLANDSIA.—These singular air plants, with two exceptions, I believe, are confined to the State of Florida. The Long Moss extends its range, and is met in all humid situations through the Southern coast states. Bartram's plant is credited by its author as growing in Southern Georgia. It was my good fortune to meet all the species in the growing state within the short period of three months, and, therefore, enjoyed the opportunity for their study. These plants are firmly attached to the limbs or trunks of trees by strong fibrous roots. They adhere, especially the larger ones, with such tenacity that it often requires some effort to effect their separation. Singularly strange, they seem to have a predilection to the Live Oak and Cypress. The *T. recurvata*, Pursh., was found growing upon old fences around Gainesville, but, with this exception, I do not recollect having seen any on other than their two favorite trees. The Cypress usually grows in low, wet situations, in circumscribed areas through the extensive pine forests, and the Live Oak selects, likewise, damp situations, preferably rich hummock soil. But these trees completely monopolize the ground on which they grow, and are constantly surrounded by an atmosphere which is peculiarly humid; also, their foliage intercepts well the piercing rays of the hot sun, conditions esssentially requisite to the growth of *Tillandsia*. It is therefore presumable that these air plants seek these trees more on account of the shade and damp atmosphere than any inherent property in the bark which would favor their germination and attachment. Exposed to the hot sun and drier atmosphere, they soon lose their healthy appearance, and become stunted in their growth, This change I have frequently noticed in specimens which had been removed to shade trees around dwellings. All are vernal species except the Long Moss, which flowers during the summer.

T. utriculata, Leconte, occurs abundantly on the upper St. Johns River and the Keys south of Manatee. It is usually two to four feet high, yet it grows taller. My French guide carried a stalk from a rich hummock to his palmetto cabin which measured about seven feet. The stems of the larger plants branch considerably, while the smaller ones do so but sparingly. The flowers are white, and not blue, as in the next five species.

T. bracteata, Chapman, the most handsome of all the Tillandsias, with its large, bright and scarlet bracts, attracts one's attention from quite a distance. It is beautiful, and would be really an acceptable acquisition to our collection of exotics. This species is not common. I met it in about 28° lat., at Lake Monroe, Tampa, and Keys further South.

T. bulbosa, Hook, resembles smaller growths of the next species, but the blue-green color of the plant, the spreading and recurving of the leaves, and the ovoid bulb formed by the dilated leaves at the base, are at once good characters for discrimination. It appeared rare and was sparingly in Hillsboro and Manatee counties.

T. juncea, Leconte, grows abundantly in the hummocks along the upper St. Johns River. It seems very prolific, as every Live Oak and Cypress is full of it in its circumscribed localities.

T. Bartramii, Ell, on account of its green leaves, appears not unlike tufts of green grass growing on the limbs of trees. It is the only species which does not have the scurf on the leaves. It occurs sparingly on the Keys south of Sarasota, the only locality observed. At Palatka grows *T. caespitosa*, Leconte, and forms large reddish clusters on the trunks and larger limbs of trees. I observed it frequently along the St. Johns River as far south as Lake George. The isolated clusters of a reddish appearance are characteristic of this species, and enable one to separate it readily in its general appearance from *T. juncea*, Leconte, which it somewhat resembles. *T. recurvata*, Pursh, in a bunch might be mistaken for the Long Moss, but the single plants are characteristic in their upright stems and recurved leaves. This is the smallest species, and was detected growing on old fences and the Live Oak at Gainsville, the only locality observed.

T. usneoides, L., the last and perhaps the most generally admired by all observers. Its beautiful festoons and pendulous bunches of gray foliage, suspended from the wide-

spreading branches of the Live Oak, give it a novel and grotesque appearance to the Northern traveler, and all admire it, and cull tufts as mementos of the sunny South. It is much used in decorating halls, dining and sitting rooms. It contributes, also, as an article of commerce in the manufactured state. It is shipped in bales to Northern upholsterers, who use it as a good substitute for hair. In preparing for market, the dead moss only is used. The colored people convey it in bundles their usual way, or on carts, to the gin, where they dispose of it for a small consideration. Thus received, it is placed in water until it is thoroughly saturated, after which it is thrown on large stacks, and is allowed to pass through a process of sweating. It is then separated, dried and ginned. In the process of ginning, the strong woody fibre in the stem becomes denuded of its leafy and bark-like covering. It is this fibre which constitutes the article of commerce. It is a glossy brown color, and quite strong. Some, by special desire of purchasers, is dyed black, so as to more nearly resemble hair. A superior article is that which has further been subjected to a process of picking, by which all foreign matter is eliminated.—Dr. A. P. Garber, *Columbia, Penn.*

Some Forking Spikes.—I was much interested in the remarks on *Plantago* in your September issue The *Plantago major*, with branching leafy spikes, has occurred here for several years. It first attracted my attention in 1862; then for several seasons I did not collect a specimen. For the past year or two it has been increasingly abundant, sometimes with every part of the plant covered with a dense pubescence, again, perfectly smooth and shining.

A few years ago I collected along the Schuylkill River, near Philadelphia, the *Botrychium Virginicum*, Swartz, with the fertile frond branched somewhat in a similar manner, two, three, or even four branches. On examining the plants to ascertain, if possible, the cause, I found in every case that there had been an injury in the early stage of the plant, by which the fertile segment had been broken off, and from that point the branches started. Of course all of them were without the direct terminal spikes, which is not the case in the *Plantago*. Several other species of ferns are found here with occasionally forking or branching fronds.

A short time ago I collected the *Setaria glauca*, Beauv., with forked spike, but in no other way differing from the ordinary form of the species.—Isaac C. Martindale, *Camden, N. J.*

Proceedings of the Davenport Academy of Natural Sciences, Vol. I, 1867–1876.—This is a thick, well-printed pamphlet of 284 pages, containing 36 plates, principally lithographic, and ten pages devoted to their explanation. In the preface is given the origin and history of the Academy, and the circumstances under which this first volume of proceedings is issued. Organized on the 15th of December, 1867, it passed through several stages of advance and decline, but within the past two or three years it has begun to enjoy a very prosperous existence. In 1875 it was thought that sufficient material had been collected to warrant the Academy in commencing the publication of its proceedings, and the present volume is the result. It is the intention, if possible to issue an additional number of proceedings as often as once a year. The price of the volume is $2.50.

Calandrinia Leana, Porter.—Dr. Gray reports this species, described in the October Bulletin, as discovered also, later in the month of August, in Siskiyou county, California, by the Rev. E. L. Greene.

All communications should be addressed to

J. M. Coulter, Hanover, Ind.

M. S. Coulter, Logansport, Ind.

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BOTANICAL GAZETTE.

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Bryological Notes.—The following species of *Musci* were collected by the writer during the fall and winter of 1875, and the identifications are partly his own and partly the result of the investigations of Prof. D. C. Eaton, of Yale College, and Mr. Eugene A. Rau, of Bethlehem, Penn. Of the genus *Sphagnum*, or Peat Mosses, we have *S. cuspidatum*, Ehrh., common in the very wet woods, and now and then one finds a few tufts of *S. squarrosum*, Pers. *Gymnostomum curvirostrum*, Hedw., is very plentiful upon the moist limestone cliff rocks and at Clifty Falls affords a firm support on the sides of the cliffs and also a useful covering for the roots of the beautiful *Sullicantia*. We have also obtained a few stems of *G. rupestre*, Schw. *Weissia viridula*, Brid., though of humble growth, makes in late winter an object of much attractiveness in the open woods and fields, with its bright green leaves and dense cluster of fruiting stems. The genus *Dicranum* has a most abundant representation in the species *D. scoparium*, L., and *D. heteromallum*, Hedw., in the moist woods, while very rarely *D. montanum*, Hedw., is found, and along some of the small streams appear small growths of *D. varium*, Hedw. *Ceratodon purpureus*, Brid., is not uncommon in the rotting debris of most woods, while *Leucobryum glaucum*, Hampe, has never been found upon the river hills, although its white foliage appears abundantly in the flat timber lands. *Fissidens adiantioides*, Hedw., is plentiful in the clayey soil of the many brooks, and *F. subbasilaris*, Hedw., is very common to old logs, stumps and bark of trees. Mr. Rau has also noted in my collection a new species described by Mr. Austin, *F. decipiens* (I think it is). *Trichostomum pallidum*, Hedw., occurs sparingly on the river bluffs. Among the *Barbulæ*, with their long hair-like peristomes, we have found but two species, *B. unguiculata*, Hedw., and *B. cæspitosa*, Schw.

The beautiful *Drummondia clavellata*, Hook., frequently spreads its rich velvety mats upon the bark of the beech, but not uncommon to other trees and even logs. *Orthotrichum strangulatum*, Beauv., hides away its unassuming presence in many a furrowed elm or maple, while its peculiar hairy calyptra cautiously steals out from among the surrounding leaves as the moisture of spring appears and snugly hides itself in the same covering from the rays of the noon-day sun. As the winter months draw to a close, *Schistidium apocarpum*, Br. & Sch., occurs in abundant fruit, giving with its peculiar brownish green an attractive covering to the drear rocks. Associated with the last, one occasionally finds small growths of *Hedwigia ciliata*, Ehrh., while over the ground in never failing abundance *Atrichum angustatum*, Beauv., never fails to put in an appearance. Of the large and striking *Polytrichums*, whose 64-toothed peristome is an object of beauty even to the untutored eye, we have the two species, *P. commune*, L., and *P. formosum*, Hedw. Along most of the woodland rivulets occurs an abundance of *Aulacomnion palustre*, Sch., while in most wet woods and thickets *A. heterostichum*, Br. & Sch., is not uncommon. Many a dull old oak or rotten log is covered with beauty by the roseate mats of *Bryum roseum*, Schreb., and here and there over the ground and about the decayed roofs of dwellings the silvery leaves of *B. argenteum*, L., are easily recognized, while the cool and limpid waters of numerous springs among the cliffs give life and beauty to the lovely *B. Wahlenbergii*, Schw. The genus *Mnium* seems at least to be well marked in quantity, if not in species, in *M. cuspidatum*, Hedw., and *M. rostratum*, Schw., which appear everywhere. The curled and matted leaves of the graceful *Bartramia pomiformis*, Hedw., together with its apple shaped fruit, helps to

make attractive many a brook side, while in sparing quantities *B. fontana* (?) Brid., and *B. Marchica*, Brid., give an interest to our moss flora to the naturalist.

In the early autumn months *Funaria hygrometrica*, Hedw., with its abundant fruiting masses appears everywhere in moist places. *Physcomitriums pyriforme*, Br. & Sch., is not uncommon in fruit in most old fields during spring. *Leucodon julaceus*, Sulliv., with its plume like stems grows everywhere on the old bark of trees and decaying logs. *Leptodon trichomitrium*, Mohr., shows its much branched and numerous fruiting stems on both logs and trees, but seems to have a partiality for the buckeye. Everywhere in the woods, and alike upon rocks and trees, one finds in striking abundance the dense cushions of *Anomodon attenuatus*, Hub., but *A. obtusifolius*, Br. & Schw., appears but sparingly. Equally abundant with the former is *Leskea rostrata*, Hedw., while *L. obscura*, Hedw., is even less common than the latter *Anomodon*. The ashy mats of *Thelia asprella*, Sulliv., are not uncommon to the bark of trees, which also may be remarked of *T. hirtella*, Sulliv. The soft and delicate *Pylaisæa intricata*, Bry. Eur., abounds in most woods. Of the flat and densely matted *Cylindrotheciums* we have, somewhat sparingly, *C. cladorrhizans*, Bry. Eur., and most plentifully, *C. sedutrix*, Bry. Eur., with its peculiar shining leaves.

On every hand one sees the lovely *Climacium Americanum*, Brid., a tree indeed, in miniature and an object of beauty to all. This moss is of peculiar interst here from its presenting many variations, and some of these are so marked that had a person but a limited amount of material he might easily persuade himself that he possessed a new variety. But with abundant material collected under different circumstances of growth, they can all be easily sifted down to the typical form. *Climacium*, although rarely found in fruit, has been collected abundantly here, and also in the state of Connecticut, in 1874. The genus *Hypnum* is well characterized here in numerous species, and of these I will make a simple enumeration: *H. aduminatum*, Beauv., *H. adnatum*, Hedw., *H. Alleghaniense*, C. Mull., *H. curcifolium*, Hedw., *H. cylindrocarpum*, C. Mull., *H. deplanatum*, Schimp., *H. gracile*, Br & Schimp., *H. Haldanianum*, Grev., *H. hians*, Hedw., *H. hispidulum*, Brid., *H. imponens*, Hedw., *H. lætum*, Brid., *H. minutulum*, Hedw., *H. recurvans*, Schw., *H. riparium*, Hedw., *H. rivulare*, Br. Eur., *H. serpens*, Hedw., *H. serrulatum*, Hedw., *H. strigosum*, Hoffm., *H. tamariscinum*, Hedw., and *H. Boscii*, Schw. *H. Boscii* I obtained in good fruit during December and January last. It was to me a most interesting find and I make this note of it on account of its rare occurrence and therefore its interest to botanists. In these notes upon the mosses of Jefferson County, we have by no means done the region full justice, our time and range being both quite limited and the single season entirely too brief for a full report. —A. H. Young, *Hanover Ind.*

Ferns from Rock Castle Springs, Kentucky.—In August last, Miss G. H. Rule of Philadelphia, whilst on a visit to Louisville, Kentucky, spent a short time at Rock Castle Springs, and during her stay there collected a variety of plants, chiefly ferns, some of which are quite rare. As it is a section of country seldom visited by botanists, I here append a list of them. From the description given by Miss Rule, of the place and its surrounding country, it would well repay a thorough exploration, and doubtless some additional species might be added.

1. *Polypodium vulgare*, L.
2. *Polypodium incanum*, Swartz.
3. *Adiantum pedatum*, L.
4. *Pteris aquilina*, L.
5. *Asplenium pinnatifidum*, Nutt.
6. *Asplenium Trichomanes*, L.
7. *Asplenium ebeneum*, Ait.
8. *Asplenium montanum*, Willd.
9. *Asplenium Ruta-muraria*, L.
10. *Asplenium Filix-fœmina*, Bernh.
17. *Aspidium cristatum*, Swartz.
18. *Aspidium marginale*, Swartz.
19. *Aspidium acrostichoides*, Swartz.
20. *Trichomanes radicans*, Swartz?
21. *Onoclea sensibilis*, L.
22. *Woodsia obtusa*, Torr.
23. *Lygodium palmatum*, Swartz.
24. *Osmunda regalis*, L.
25. *Osmunda Claytoniana*, L.
26. *Osmunda cinnamomea*, L.

11. *Camptosorus rhizophyllus*, Link.
12. *Phegopteris polypodioides*, Fee.
13. *Phegopteris hexagonoptera*, Fee.
14. *Aspidium Thelypteris*, Swartz.
15. *Aspidium Noveboracense*, Swartz.
16. *Aspidium intermedium*, Willd.
27. *Botrychium Virginicum*, Swartz.
28. *Lycopodium alopecuroides*, L.
29. *Lycopodium dendroideum*, M.
30. *Lycopodium complanatum*, L.
31. *Selaginella rupestris*, Spring.
32. *Selaginella apus*, Spring.

The rocks are very abrupt and steep along the river near the "Springs" and it was with great difficulty that some of the specimens were obtained. *Asplenium pinnatifidum*, Nutt., was formerly quite abundant on the cliffs on the Schuylkill near Philadelphia, but of late years very little has been seen there. The specimens from Rock Castle have fronds very much larger, some of them measuring eight inches in length, having a very long and slender prolongation and fertile nearly to the tip. The *Trichomanes radicans*, Swartz? was collected only after a long and laborious search far up among the rocks where the dripping water kept it constantly wet. The specimens were very large and in good condition. This is one of the rarities of that section, and I believe is about its most northern range.

Asplenium Bradleyi, D. C. Eaton., a new species, had been said to grow in the vicinity, and *Asplenium ebenoides*, R. R. Scott., the so called hybrid fern, having been collected a little farther south was also looked for, but Miss Rule did not succeed in finding either of them.

Camptosorus rhizophyllus, Link., was of very luxuriant growth, frequently two or three, and on one occasion I am informed *four* generations were linked together.

ISAAC C. MARTINDALE, *Camden, N. J.*

MISCELLANEOUS NOTES.—In regard to Dr. Douglas' note in the October *Bulletin* I wish to say a word. *Erechthites hieracifolia*, Raf., grew abundantly three years ago last August at Whitewater, Wisconsin, and under such surroundings that I am not willing to believe I noticed it on its first appearance in the place. *Lobelia syphilitica*, L., is often white in Wisconsin. I found a station on Skinner Creek, Green Co., Wis., from which I gathered white specimens for several years and have not the least doubt but they can be had there to-day.—HERBERT E. COPELAND.

I find on looking over some specimens in my herbarium a peculiar form of *Elephantopus Carolinianus*, Willd. The peculiarity consists in the leaves being opposite instead of alternate. Near the base of the specimen the leaves are in whorls of three, but when they advance further up the stem they are very clearly opposite. I examined the specimen somewhat critically in order to see if other variations did not occur, but could find none unless it was the absence of the characteristic "*somewhat hairy*." I did indeed find some hairs, yet hardly enough to be noticed in describing the plant.

Among our cultivated plants we have very commonly *Euphorbia marginata* Pursh. About two years ago it began to escape and now on the north bank of the Eel river it covers a low bluff for nearly a mile. I have not seen it recorded as having become naturalized as far north as this before, nor did I see it, except as cultivated, until in 1874. From my knowledge of its hardiness and rapidity of growth, I presume we may certainly count it as a permanent resident.—M. S. C.

A few weeks ago I found near Loveland, Ohio, a peculiar form of Ragweed (*Ambrosia artemisiæfolia*). Gray, in the description of the genus says: "Sterile and fertile flowers occupying different heads on the same plant: the fertile 1—3 together and sessile in the axils of leaves or bracts, at the base of the racemes or spikes of sterile heads." In the specimens I found there were no sterile flowers to be seen, and instead of the fertile flowers being in the axils of the leaves, they were arranged in upright spikes as the *sterile* usually are. There were some half dozen plants in a space about 50 yards square in one locality, and in another place one and the largest specimen, less than three feet high. A year or so ago my brother found a specimen of the same kind, but he does not know where. Is this a common thing to find or not?

I notice in the October BULLETIN that a correspondent found a white *Lobelia syphilitica*. About a month ago I found one about two miles from our house. It was growing within two inches of a plant with the flowers blue and was the only one seen, although the blue ones were plenty enough. A week after, in a damp place in an open wood, I found two specimens growing close together with pinkish flowers.

A couple of years ago we found in the east end of Cincinnati, along side of a railroad track, numbers of the *Euphorbia marginata*, seemingly perfectly naturalized. This is recorded as a native of Nebraska, but has made its way east and established itself. Last year it was abundant and this year also.—JOSEPH F. JAMES, *Cincinnati*.

I would like to send a few notes on some variations in plants, noticed at different times, and in different places. In 1872–3–4, I very frequently found *Polygonum amphibium* with salver form stipules. The var. *terrestre* especially showed this feature. Sometimes I found it growing on high, dry, sandy soil, quite hairy with rust colored pubescence. I also found *P. Careyi* with salver form stipules. I wrote to Prof. Gray, but could not learn that he had ever seen this feature. The past season I found the same variation in the var. *terrestre* of *P. amphibium*, around Bloomfield, Conn. I also found *P. arifolium* in several localities with salver form stipules. From this it would seem as if the whole of this genus might, under certain circumstances, present this singular feature. One form of *Polygonum*, very frequent in southern Iowa I have never seen noticed, though it may have been. When young, the leaves had the color and the woolly pubescence of a *Gnaphalium*, but when old the leaves more resemble those of *Aster sericeus* in their silky appearance Often there were dark triangular patches on the young leaves. The plant was from four to five feet high, but I never was fortunate enough to find it in bloom except once, and the blossom was somewhat like *P. amphibium*. It generally grew on rather low ground.

Perhaps the white *Eupatorium fistulosum* is not so rare as some other forms, but I have found several specimens the past season. Also the *Eupatorium purpureum* with opposite leaves, in several localities. Last year I found *E. perfoliatum* with leaves in threes, and also with purple flowers. This year I have found a great many specimens with purple flowers, and in these cases the stem was often purple.

I have several times noticed the feature, referred to by one of your correspondents, in *Verbascum Thapsus*, and also in *Lappa major*. The "wavy" apearance in the leaves of young plants of the mullein is very common. I found a very remarkable *Hieracium* last fall. It was a young plant, growing in a cleft of a trap rock. The older leaves were thin and veiny, not much unlike those of *H. renosum*, L., but more hairy and nearly oval, but the younger ones were like the young leaves of *Verbascum Thapsus*, except they tapered into a short petiole. There seemed to be a regular gradation in the transition. Can any one give a little light on the subject of these variations?—N. COLEMAN, *Bloomfield, Conn.*

I find the seed vessels of *Staphylea trifolia* three, four and five-celled in the same cluster and upon the same tree. Gray and Wood give the seed vessels *three*-celled without exception, but upon quite a large tree for the *Staphylea* I find them usually four-celled. Has any one else noticed the same?

Is it usual for the bud of *Trillium cernuum* to be *erect* till nearly the time of flowering? I have found several erect at first, afterward the bud quite inclined, then the flower hanging under the leaves.—C. C. H., *Poughkeepsie, N. Y.*

POLYMNIA CANADENSIS, L., VAR. DISCOIDEA.—This is only the late-flowering state of the species, judging from a plant in my garden, which bore the ordinary flowers with rays early in the season, but in September branched extensively and produced an abundance of discoid heads.—P., *Oquawka Ill.*

CLAYTONIA VIRGINICA, L.—The following observations on *Claytonia Virginica* may be of interest, as they seem to establish the fact of heteromorphism. The following variations were noticed:

1. The larger number of specimens were roseate, with stamens equaling or exceeding the style, anthers all perfect and polien bearing.

2. A smaller number of specimens have flowers pure white, smaller every way; style as in No. 1; stamens imperfect, filaments short and unequal, anthers bearing no pollen.

3. Specimens were found with flowers as in No. 1 and No. 2, growing from the same tuber, on different stems.

4. Later in the season a number of specimens were found, in which a part of the stamens of each flower were of ordinary length and perfect, and part were short and abortive. Fruit was perfect and abundant in all forms. How can Prof. Meehan's theory of self-fertilization during "sleep" work in No. 2? Nearly the same variations were noted in *Epigæa repens*, except there was no difference in length of styles in two forms.

I found a half dozen specimens of pure white *Lobelia syphilitica* a few days before I received your October No.—C. F. WHEELER, *Hubbardston, Mich.*

SEVENTH ANNUAL REPORT OF THE GEOLOGICAL SURVEY OF INDIANA, BY E. T. COX, STATE GEOLOGIST, 1875.—This is the largest report sent out by the Geological Survey, containing some 600 pages of valuable material. Two contributions are of special interest to botanists and hence come within the scope of the GAZETTE to notice. They are "Species of Fossil Marine Plants from the Carboniferous Measures," by Prof. Leo Lesquereux, and a "Catalogue of the Flora of the Lower Wabash," by Dr. J. Schneck. The latter is worthy of a more extended notice than can be given it in this number and will be reviewed in a subsequent article. The former more strictly belongs to Geology, but is of interest to all botanists interested in the ancient as well as the modern flora of our country. It is a description of five new species of fossil marine plants from the coal measures, and their interest and importance cannot better be stated than in the introduction of the author.

"The occurrence of fucoidal remains or of fossil marine plants, in the coal measures, is extremely rare. Indeed it is questionable if any species of this kind has ever been discovered in the carboniferous formation of Europe. In this country one species only has been described, in 1866, from specimens found in a thin bed of limestone, occupying the place of the millstone grit, opposite Wurtemberg, on Slippery Rock creek, a branch of the Conneconessing river in Pennsylvania. The species is related by its characters, to the so-called and well known *Fucoides Cauda-galli* of the middle and upper *Devonian*, and therefore does not represent ancient types, like those which are described here, and which recall the oldest forms of marine plants, those of the Silurian, even of the lower divisions of this formation, the calciferous sandstone of New York.

It may seem of little importance to have plants of this kind described and figured in a geological report, but as geologists have to consider, for the determination of the age of the strata of our earth, the remains of plants and animals which, preserved in their compounds, may determine by their nature the position of valuable deposits of minerals, even mere fragments of these organisms become important for their researches. And when fossils are found, which not only represent new types of plants or of animals, but which are remarkable by their presence in a formation where nothing like has ever been found, the discovery is indeed worth recording in the annals of geology, and gives to the report where they are described a wide and general interest."

ASTER OBLONGIFOLIUS, Nutt.—Beautiful specimens of this *Aster* were found growing at Clifty Falls, October 12th of this year. It takes the form of a small shrubby

bush and grows at the very edge of the cliffs, hanging down over them so as to make it almost dangerous to collect it. Near Madison it was found growing all over one hillside, its large violet-purple heads making it an object of much beauty. Its leaves are so rigid that they soon dry and become very brittle and hence in collecting specimens in flower all the lower leaves are apt to drop off and leave only the leafless stock.—J. M. C.

RECENT PERIODICALS.—*American Journal of Science and Arts*, October. The only botanical note is an extract from the *Buffalo Courier* on "Sensitive Stigmas as an aid to cross fertilization of Flowers," by Prof. W. J. Beal, read at the recent meeting of the American Association held at Buffalo. Observations were especially made upon *Martynia proboscidea*. It seems that the humble bee or common hive bee aids in the cross fertilization of this plant. When the bee, loaded with pollen, alights on the spotted, showy part of the corolla, it crawls in, first hitting the stigmas. "These are sensitive to the touch and close up in five to ten seconds, often before the insect is ready to back out of the flower. If they are not quite closed at that time, the bee shuts them by pushing her back against the back of one of the stigmas. The lower lobe of the flat stigma next to the bee's back is the larger. No pollen can be left as the insect retreats and a cross of pollen is usually certain. If not freely dusted with pollen the stigmas open again in about fifteen minutes." The *Iris* is mentioned as acting in a similar way. The stigmas of *Mimulus ringens* are also sensitive and dusted with pollen by small Hymenoptera. The stigmas of *Mimulus luteus* and *M. moschatus* close quickly upon being touched. *Tecoma radicans*, *T. grandiflora* and *Utricularia vulgaris* are all like *Martynia* in the peculiarities mentioned.

American Naturalist, October.—"Carnivorous Plants," by Prof. W. J. Beal, is rather an enumeration of those species and genera of plants which catch insects by various contrivances. Commencing with the discovery by Mr. Ellis, in 1768, of the powers of the Venus fly-trap, we are led down through *Drosera*, *Sarracenia*, *Nepenthe*, *Pinguicula*, *Utricularia*, *Solanaceæ*, and *Silene*, to *Martynia proboscidea* which the author thinks is a true insectivorous plant. This plant, with its curious cross fertilization and insectivorous propensities, may prove to be an exceedingly interesting one. As *Martynia* is within reach of almost every reader of the GAZETTE, I have thought it would not be unprofitable to quote some of the observations made upon it by Prof. Beal, and they can be very easily verified by almost any botanist:

"I have lately given some attention to the *Martynia* on account of the great number of small insects which it catches by glandular hairs. On August 3d I counted seventy-six small Diptera and some other insects on the upper side of a young leaf of about four inches average diameter, and two hundred on the under side. The insects are caught on all parts of the plant which are exposed, on the stems, on the calyx and corolla, including even the throat of the corolla. Among a lot of others was one plant about three feet high, spreading three feet in diameter, which according to estimate had seven thousand two hundred small flies on it at one time. The hairs are very numerous all over the surface. None of them are sensitive, as I can find. They vary exceedingly in length, from three-sixteenths of an inch to one one-hundredth or even shorter. Some of them have as many as ten cross partitions. The contents of these cells appear quite clear, except one near the top, next to the top cell. This is larger than several of those below, and contains chlorophyll. It seems to be something like a gland. Above this is a larger cell, with perpendicular striæ along its sides. When fresh and undisturbed the top is nearly spherical and resembles a small drop of dew. The secretion is quite copious and exceedingly viscid, with an unpleasant odor. I placed some small fragments of raw beef on the glands one morning, but the sun seemed to dry them up, much as it did those left on blades of grass which had no glands. I placed some very minute portions on the glands in a spot sheltered from the

direct rays of the sun. In some cases the whole of the pieces of beef disappeared. The small insects seem to live but a short time, although they are touched by only two to four hairs. The substance seems soon to be taken out of the insects. In my opinion, it is a true insectivorous plant."

Gardener's Monthly, October. This old and ably edited monthly is always full of matter interesting to all botanists, not only to the horticulturist but the scientific botanist. We can only make mention of one or two notes to be found under the department of "Natural History and Science." An article "On Graft Hybrids" by Thos. Meehan, the Editor, read before the American Association for the Advancement of Science, at Buffalo, goes to prove from actual experiment that hybrids may be obtained by grafting as well as by seeds. An interesting extract is made from a letter written by Mr. J. G. Lemmon, a California botanist upon the age of the Mammoth Trees (*Sequoia gigantea*). In it Mr. Lemmon takes sides with Dr. Gray and combats the popular notion that these trees are several thousand years old.

Field and Forest, October. The 'Flora Columbiana' is brought down to *Liliaceæ*. A pear tree in the grounds of the Department of Agriculture blossomed, September 8th, for the second time, the first set of leaves and fruit having been destroyed by a small fungus in July. A new locality for *Tipularia discolor* has been discovered where an abundance of this rare Orchid can be obtained in flower. It is common in the leafing condition, but the flowers do not appear till long after the leaf has disappeared. The new locality is on the Virginia shore of the Potomac not far above the Three Sisters. The exact time for collecting it in flower is the last week in July.

Proceedings of Davenport Academy of Natural Sciences.—We noticed very briefly in the GAZETTE for November the volume published by the above society. Some papers bearing on Botany seem to us deserving of a fuller mention than was then given. The papers of special interest to botanists are "Obituary Notice of Prof. John Torrey," by *Dr. C. C. Parry*, "Summer Botanizing in the Wasatch Mountains, Utah Territory," by the same author, and "List of Phænogamous Plants collected in the vicinity of Davenport," by *J. G. Haupt* and *J. J. Nagel*. The first paper, read March 28th, 1873 is a beautiful and touching tribute to the memory of the "father of American Botany" by one who had known him well for twenty-eight years.

The second paper, by the same author, is one of special interest and worthy of a separate notice. It is in the form of a letter addressed to Dr. Gray and is a brief sketch of summer botanizing in the Wasatch during the season of 1875. The author wished especially to note the geographical range of the *Coniferæ* from East to West. He selected as camp a location near the head of Lake Utah, "not far from the high culminating point of the Wasatch range known as Mount Nebo." "One main object of our trip was to determine definitely the important practical question whether the fruiting of *Abies* was strictly biennial, or, in exceptional cases, annual. I had noted, in 1874, the abundant seeding of *Abies* all over this district, extending to the Eastern Rocky Mountains, but now not a single developing cone could be met with in passing through extensive forests of *Abies concolor*, this condition also holding good of other species. The same fact has also been noted by the enterprising collector, J. G. Lemmon in the Sierra Nevada, so that it may be definitely stated, for the benefit of future collectors, that only on *even years* can *Abies* be relied on for a seed crop."

An interesting description is given of the remarkable *Spiræa cæspitosa* which is such an interesting plant that I know readers of the GAZETTE will be pleased to read a description of it from so able a writer and so acute an observer as Dr. Parry.

"Among the plants affecting rocky locations, the most eagerly watched and the latest to flower was the remarkable *Spiræa cæspitosa*, Nutt. Popularly known under the appropriate common name of "*tree moss*," it spreads its closely matted foliage over the face of bare rocks, insinuating its taproots, abundantly garnished with terminal fibers, into the narrowest crevices, to which it adheres with a grip almost as tenacious

as the rock itself; only when accidentally it has taken root in a coarse gravelly *debris* can it be successfully removed with its terminal fibrous roots. The main stem, often attaining a thickness of an inch or more, divides horizontally into radiating gnarled branches, which send off from the axils of the primary leaves numerous leafy rosettes by which the growth of the plant is maintained, and from the axis of which the slender bracted flower stems arise. These stems from 3 to 6 inches high are crowned for about one-third their length with a dense cylindrical spike of small white flowers, with exserted style and stamens, set in a light green tomentose calyx. In thrifty specimens these flowering spikes are occasionally branched. The prostrate growing shoots whenever they light upon a suitable crevice strike root and thus help to maintain the growth of the parent plant; where these favorable conditions are wanting, the whole plant, often covering several square feet, can be lifted up, showing on the under surface the remains of dead leaves, in the decaying mould of which moisture is retained to keep up the fresh verdure of the young twigs. It seems to flourish best on the north side of exposed limestone rocks occupying a considerable range of altitude above the lower foothills, choosing by preference the rugged slopes of moderately steep canons. Its flowering period is earliest on the higher elevations, continuing from the latter part of August to the first of October. The peculiar adaptation of this plant for ornamental rock work can be appreciated by those who have once seen it in its native haunts, and it is hoped that from plants and seeds somewhat copiously collected it may eventually find a much larger number of admirers in gardens devoted to this charming class of horticultural adornments."

A STRANGE COLLINSIA.—During the season I received a flower for determination, which at first glance I pronounced to be *Collinsia verna*, Nutt. On closer examination however I found the specimens I had presented two marked variations from the typical plant. The whole were invariably 8-flowered instead of "*about six.*" Then the corolla instead of being only "*twice the length of the calyx*" was in every instance fully three times its length. On searching the locality in which they had been found, I discovered that an area of about one-half an acre was thickly covered with the plant, and that fully a third of the specimens presented these variations. Heretofore all my observations of Collinsia have led me to believe it to be a constant species. The locality in which these irregular Collinsias occur was a moist ridge slightly above the level of the surrounding swamp. The soil, the rich black loam characteristic of our Indiana prairies. I regret exceedingly that having no facilities for preserving them I secured no specimens. M. S. C.

In the italicised characteristics of *Rudbeckia hirta*, L., I find, upper leaves *sissile*. I have specimens in which the upper leaves are distinctly petioled. The petiole broad-margined. It may be possible that the specimens are in an imperfect state, although it seems to me, every other characteristic being perfect, that there can be no doubt that this is a variation from the typical plant. I noted it only on account of its differing from the description in Gray's Manual, and because I deemed these slight departures from the typical form of interest to botanists. M. S. C.

All communications should be addressed to

John M. Coulter, Hanover, Ind.

M. S. Coulter, Logansport, Ind.

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A NEW CUSCUTA, new at least to North America, comes now from California. A great wanderer is this *C. corymbosa*, which nearly 40 years ago stirred up the botanists of Europe, and the agriculturists not less. This interesting plant has quite a little history of its own. At the period indicated, between 1839 and 1843, an unknown *Cuscuta* made its appearance almost simultaneously in different parts of western Europe, and, singularly enough, always on Lucerne fields. In Germany it was described as *C. suaveolens*, *C. Hassiaca*, *C. diaphana*, and *Engelmannia migrans*, until Choisy, in DC. Prod., recognizing its American origin, took it for *C. corymbosa*, R. & P. In my monograph of Cuscuta, 1859, I established the identity of the immigrant with the South American *C. racemosa*, Mart., which had been introduced into Europe with the much vaunted Chilian *Alfalfa*, in reality the old established European fodder plant, the *Lucerne*, and which proved very destructive to its nurse-plant. After 10 or 15 years the energetic measures of the farmers, together with wet and cool summers, in which the seeds did not mature, seem to have eradicated the plant entirely, and as far as I am informed, it has not been heard of again in Europe. But now, lo and behold, our wanderer makes its appearance in northern California, and, precisely as before in Europe, in Alfalfa fields, "proving very injurious." It has been, without doubt, here also imported from Chili.

Rev. E. L. Greene, who has found so many new native plants in the Shasta Valley, sends also this troublesome newcomer. How long it has been there or whether it has appeared in other parts of California, where under the well-sounding name of Alfalfa the Lucerne is frequently cultivated, is as yet unknown, nor whether it will establish itself permanently. It may be well to direct the attention of the farmers, who cultivate Alfalfa, to this dangerous enemy and to urge them to destroy any dodder which may show itself in their fields, before it can spread or mature seeds. *C. racemosa*, Mart., belongs like our common *C. Gronovii* to the section *Cleisto grammica*, characterized by two styles of unequal length tipped with capitate stigmas and a not-opening (baccate) capsule. Ovary and capsule are thickened towards the apex and somewhat pointed; inflorescence loosely paniculated with longish pedicels; flowers 1½—2 lines long, of thin texture, tube of corolla deeply campanulate, widening upwards, spreading lobes inflexed at the acute tip; scales nearly the length of the tube; capsule commonly enveloped by the corolla.

The variety, *Chiliana*, Eng. Cusc. p. 505, to which this form belongs, has larger and more delicate flowers than the original Brazilian type.—G. ENGELMANN.

THE OLDEST LIVING BOTANIST.—The oldest living botanist is probably the Swede Elias Fries, born in 1794, and this eminent man is still active.

He is a profound philosophical Botanist, the basis of whose systematic arrangement of the Fungi is still followed; and the Lichenological system presented in his *Lichenographia Europæa Reformata*, published in 1831, is still, with such modifications as the advance of knowledge requires, the best that has been prepared, and is not likely to be superseded. The introductory remarks should be studied by all who take up this branch of botany, and the descriptions have not been surpassed. Fries's botanical publications are numerous, the most important of them being devoted to the Fungi and Lichens. In 1872 he commenced the publication of an illustrated work on Fungi, several fascicles of which have been published.—W.

DIPLOPAPPUS ERICOIDES, T. & G.—To save labor to some others who, like myself, work under the double disadvantage of a rather limited library and an herbarium (rich enough in the later new species) with but few specimens from the original sets made prior to 1862, I put the following in print. From our present standpoint it is evident that *Diplopappus* as formerly understood must be partitioned out among other neighboring genera, and of the species that concern us here one goes to section ERICAMERIA of *Aplopappus*, and the other to section ORTHOMERIS of *Aster*. In the unavoidable changing of names a confusion arises under the name above given, i. e., *Diplopappus ericoides*, there being two plants that bear the name in herbaria and books. The following may in some sense clear up the matter:

Diplopappus ericoides, T. & G. *Eucephalus ericoides*, Nutt. "*Inula? ericoides*, Torr! in Ann. Lyc., New York, 2, p. 212. *Chrysopsis ericoides*, Eaton, Man. Bot."

Now placed in *Aster* under Sect. ORTHOMERIS. As the name *ericoides* is preoccupied in this genus I suggest for it *Aster ericæfolius*, which indicates even more closely its general habit.

See also *Diplopappus ericoides*, T. & G., Vol. V., King's Report; Pl. Wright., p. 78; Pl. Fendl., p. 69; Bot. Mex. Bound., p. 78.

Diplopappus ericoides, Less. *Aplopappus ericoides*, DC., and apparently also of Hooker and Arnott. See DC., Prod. V., p. 278; Bot. Beechy, p. 146; and Fl. Cal. I, p. 313.

In the last, *Ericameria microphylla*, Nutt., is also cited as another name for the same, and by this it appears in Flora of North America, T. & G., 2, p. 236.

The two plants are so different in habit,—the one suggestive of (so far as arrangement of the foliage goes) *Erica*, and the other of *Adenostoma fasciculatum*, Hook & Arn., or of *Eriogonum fasciculatum*, Benth.—as well as in habitat, that any further description is unnecessary.—J. T. ROTHROCK.

BOTANICAL RAMBLES IN EAST FLORIDA.—It was the 16th of February last when the fast and comfortable steamer "Gen'l. Sedgwick" landed me at the beautiful little town of Palatka, located upon an elevated site on the west bank of the river, and about 75 miles from Jacksonville. The enterprise and neatness of the place with its pleasant surroundings make it at once attractive and inviting to the traveler. I walked through the open built town to a hotel and my attention was attracted and my mind absorbed by the novelties along the way. Everywhere appeared the faces of Northern citizens. The handsome white dwellings and large hotels were pleasing to the eye. The natives struggling through the deep loose sand in the streets with their ox-teams suggested poverty with the ludicrous. The wild orange trees laden with golden fruit, and perfuming the air with their fragrant blossoms, ornamented the streets. The mulberry was dropping its ripe fruit. The mocking birds, perched on the shrubs and trees, made the air tremulous with their many and varied tuned melodies. The bee was homeward bound, ladened with the poisonous pollen of the Jessamine. The grasshopper manifesting all the suppleness of a midsummer day, and even the house fly, emboldened with brazen effrontery, would alight in the stranger's way. Indeed, everywhere seemed to be life and it was difficult for me to realize the transition from the cold northland to this balmy June climate of the "Sunny South."

The St. John's is a beautiful stream of water, placid and winding with many fine coves along its banks, and neat cottages with fine orange groves at frequent intervals. So tranquil are its waters that the current is not perceptible save at times as marked by a line of the single floating plants of the *Pistia spathulata*, Michx., which advance from and recede to the coves with the falling and rising of the tide. After several hours sailing the vegetation along the river appeared more advanced, the maple was just in full foliage and the black willow green with leaves, the cypress was dropping its long pendulous aments, and the *Styrax grandifolia*, Ait., white with blossoms. The Australian pine and the saw palmetto are constant companions, and so abundant are the large root stems of the latter that the tannic acid washed from them by the rains and uniting

with the iron in the soil will produce ink, it is thought, sufficient to account for the dark color of the water of this grand river of four hundred miles in length.

On this more elevated land at Palatka are seen large trees of *Quercus virens*, Ait., and *Magnolia grandiflora*, L. In the streets and lots appear *Nasturtium tanacetifolium*, H. & A., *Sisymbrium canescens*, Nutt., *Sagina subulata*, Wimmer, and *Dichondra repens*, Forst., var., *Carolinensis*, Chois. Out of town one gets into the open pine land where *Pinus Australis*, Michx., is monarch of the forest. Along the streamlets and ponds *Magnolia glauca*, L., *Persea Carolinensis*, Nees., var. *palustris*, Chapm., *Salix nigra*, Marsh., *Myrica cerifera*, L., *Itea Virginica*, L., *Ascyrum Crux-Andreæ*, L., *Gelsemium sempervirens*, Ait., and *Smilax laurifolia*, L., principally make up the thickets. In the open pine land *Quercus virens*, Ait., var., and *Catesbei*, Michx., *Ilex Dahoon*, Walt., and *glabra*, Gray, *Andromeda nitida*, Bartr., *speciosa*, Mx., and *ferruginea*, Walt., contribute mainly to the woody undergrowth. Perhaps a mile from the river the land makes a gentle rise and the low pine land changes to the drier sandy upland. It was on this soil where *Asimina grandiflora*, Dunal, and *Ceanothus microphyllus*, Michx., occurred, and just commenced to flower. With them appeared others of equal interest, like *Sporobolus junceus*, Kunth, *Houstonia rotundifolia*, Mx., *Berlandiera subacaulis*, Nutt., *Phlox procumbens*, Lehm., *Crotalaria ovalis*, Pursh, and the prostrate *Astragalus obcordatus*, Ell. Intermediate to the dense growth, along the river, of deciduous trees and the piny uplands back of it, extend the piny lowlands, the soil of which is wet and requires draining to render it fit for cultivation. In this damper soil *Drosera brevifolia*, Pursh, *Erigeron vernum*, T. & G., *Ascyrum amplexicaule*, Mx., *Hypericum fasciculatum*, Lam., and var. *aspalathoides*, Chapm., *Polygala lutea*, L., *Aster squarrosus*, Walt., not in flower, *Pinguicula lutea*, Walt., and *pumila*, Mx., *Bartonia verna*, Muhl., and *tenella*, Muhl., *Spiranthes gracilis*, Big., *Listera australis*, Lindl., *Calopogon parviflorus*, Lindl. *Hypoxys juncea*, Smith, *Pæpalanthus flavidus*, Kunth, and *Ophioglossum bulbosum*, Michx., appeared at home. *Sarracenia variolaris*, Michx., not yet in flower, but the new leaves were of common occurrence. More sparingly appeared *Vaccinium myrsinites*, Michx., *Satureia? rigida*, Bart., and *Coreopsis aurea*. Ait., the last in general appearance and habit resembling our common *Bidens*. Around the shallow ponds, of which there are many in these pine lands, grew *Utricularia striata*, LeConte, and *subulata*, L. The area for convenient field work after a week's ramble became somewhat monotonous, and with one more walk, in which *Olea Americana*, L., was seen in bloom and *Rhizogonium spiniforme*, Birk., *Tetraplodon australis*, Sull. & Lesq., and *Bryum provinciale*, Phil., in fruit, were added to the list, I took my departure on the U. S. Mail Steamer to another field, about 125 miles farther south, on Lake Monroe. Sailing on this sluggish stream, distant views are intercepted by the frequent and sudden windings of the river and the large trees with the dense undergrowth along its banks. The large ocean steamers are now replaced by smaller ones, and the river becomes narrower and more winding, turning upon itself at sharp angles almost every quarter or half mile, and in many places boats can pass each other only at the interval of the bends. I was impressed with the great abundance of the mistletoe, appearing for a distance of over fifty miles along the river. Scarcely an oak could be seen which had not tufts of this green plant growing on some of its limbs. Occasionally could be seen dead oaks with the dead parasitical growth attached to its limbs, suggesting the idea of mutual starvation. Large red tufts of *Tillandsia cæspitosa*, LeConte, upon the oak, and green mats of *Polypodium incanum*, Swz., on the declining trunks and larger limbs of the same tree, were also of common occurrence, The *Sabal Palmetto*, R. & S., which heretofore appeared sporadically and dwarfed, now became very abundundant, frequently forming dense groves or palmetto hummocks, and attaining a height of 30 to 40 feet. The following morning the steamer stopped a few minutes at a wood station for fuel, presenting an opportunity to examine the vegetation. Although but a five minutes' privilege, I detected *Vitaria lineata*, Swz., *Polypodium aureum*, L. and *Octoblepharum albidum*, Hedw., all on the trunk

of the Cabbage Palmetto. The golden polypod, as afterwards seen, was most abundant and vigorous on the trunk, 20 to 30 feet from the ground, just beneath and in the shade of the spreading Palmetto leaves. We arrived the same day at Mellonville, located on the south bank of Lake Monroe, a quaint old town with little for attraction to the stranger. The vegetation, however, had changed, and I was soon located and prospecting for new plants. Many of my former acquaintances appeared, and in better collecting condition, but their enumeration will be omitted. The contour and topography of the country, the nature of the soil, and the character of the timber, are essentially the same as at Palatka, except the dense Palmetto hummocks replace the maple farther north. Here also the dense woody timber skirts the lake, and back of this extends the piny lowlands to the piny uplands. On this elevated or salamander land, where these vigilant miners display wonderful activity in the construction of a great number of diminutive mounts, I added to my list *Helianthemum Carolinianum*, Mx., *Stipulicida setacea*, Mx., *Polygala grandiflora*, Walt., *Indigofera tinctoria*, L., *Rhynchosia tomentosa*, var., *monophylla*, T. & G., and *Desmodium triflorum*. The last, as Dr. Chapman tells me, is an introduction from the Indies. In the lowlands grew *Clematis Baldwinii*, T. & G., *Oldenlandia glomerata*, Mx., *Pterocaulon pychnostachyum*, Ell., *Leptopoda puberula*, McBride, *Chaptalia tomentosa*, Vent., *Lygodesmia aphylla*, DC., *Centunculus minimus*, L., *Pinguicula elatior*, Mx., *Gratiola quadridentata*, Mx., *Buchnera elongata*, Swartz, *Sabbatia Elliottii*, Steud., *Tradescantia rosea*, Vent., *Xyris brevifolia*, Mx., *Eriocaulon gnaphaloides*, Mx., and *Fuirena scirpoidea*, Vahl. In the drier and more barren of these lands appeared *Polygala nana*, DC., the dwarf of the genus. In the streets of the village were patches in bloom of *Vinca rosea*, L., and *Eragrostis ciliaris*, Link. Along the lake or river, for the former is simply an expansion of the latter, was found *Sagittaria lancifolia*, L., and on the muddy flats, *Sesuvium pentandrum*, Ell., *Micranthemum Nuttallii* Gr., *Lippia nodiflora*, Mx., and *Azolla Caroliniana*, Willd., the last, like the *Pistia*, assuming an amphibious nature, growing equally well on the land and in the water. In the adjacent hummocks the vegetation was interesting and rich in species, yielding in abundance and in good condition S. Watson's variety of *Lobelia Cliffortiana*, Willd., with *Vicia micrantha*, Nutt., *Ilysanthes grandiflora*, Benth., *Micromeria Brownei*, Benth., *Eryngium Baldwinii*, Spreng., *Samolus Valerandi*, L., var. *Americanus*, Gr., and *Iris hexagona*, Walt., with others of equal interest, like *Berchemia volubilis*, DC., coming in flower, *Epidendrum renosum*, Lindl., in fruit, *Vicia acutifolia*, Ell., *Leptocaulis dicaricatus*, DC., *Tillandsia bracteata*, Chapm., with its bright and glossy scarlet bracts, the prolific *T. juncea*, LeConte, and *T. utriculata*, LeConte, *Myrica inodora*, Bartr., *Aspidium patens*, Swz., and *Blechnum serrulatum*, Mx., the last abundant and in fine condition, as well as the *Vittaria* and the golden polypod, previously detected. Near the village of Enterprise, on the north bank of the lake, I met *Zanthoxylum Caroliniannum*, Lam., *Modiola multifida*, Mœnch., *Parietaria debilis*, Forst., *Iresine diffusa*, H. & B., and, on the banks of a stream flowing from a large sulphur spring, *Hydrochloa Carolinensis*, Beauv., in dense mats.—A. P. GARBER.

[*To be continued.*]

CATALOGUE OF THE FLORA OF THE WABASH VALLEY BELOW THE MOUTH OF WHITE RIVER.—This botanical paper, by J. Schneck, M. D., appears in the report of the Geological Survey of Indiana for 1875. The plants contained in the catalogue are principally from two counties in Indiana, Gibson and Posey, and one county in Illinois, Wabash, although three other counties of the latter State are represented. The region embraced is one of the most interesting and well defined botanical fields in the state and the many rare plants contained in this list are only what botanists acquainted with the topography of the country have expected. Perhaps the most striking physical features of the Lower Wabash are the cypress swamps and bayous with their wealth of aquatic plants and the barrens of the higher ground. These natural openings covered with but scant if any forest growth yield our most prized plants, and a very rapid

glance over this catalogue will show the many good things such localities have given to our author. It is to be regretted that Dr. Schneck's time is so fully occupied that he cannot keep on hand a stock of duplicates for exchange. A striking feature of the flora of this region is the abundance of southern types. Up this low valley, running nearly north and south, many plants have found their way which one would scarcely expect to meet except in a more decidedly southern flora. These low rich bottoms have yielded such monsters in growth, especially among the climbers, that one is reminded of a South American jungle. Just hear Dr. Schneck's testimony on this subject. "Here I have found a grape vine (*Vitis Labrusca*), thirty-two inches in circumference, and near one hundred and fifty feet long, hanging from the massive branches of a lofty tree, appearing as if a monstrous cable suspended from the overhanging sky; Trumpet Vine (*Tecoma radicans*), thirty-eight and one-half inches in circumference, and climbing to the topmost branches of a tall tree, decorating it from root to top with a profusion of its foliage and orange-red trumpet shaped flowers; Cross Vine (*Bignonia capreolata*), ascending in a straight line the massive shaft of an oak, elm, or black walnut, to the height of seventy-five feet, its green, scarlet tinged foliage of winter persisting until late spring; Single-seed Cucumber (*Sicyos angulatus*), matting all bushes and vegetation, within ten feet of its root, into a thicket, or climbing up a neighboring tree to the distance of sixty-three feet; and in one instance, six climbing plants (*Smilax rotundifolia*, *Menispermum Canadense*, *Ampelopsis quinquefolia*, *Bignonia capreolata*, *Vitis cordifolius*, *Aristolochia tomentosa*), supporting themselves on the body and branches of one small American Elm." The author also gives us the names of several species which he thinks are disappearing with advancing civilization and will eventually have to be stricken from the flora of the Lower Wabash. The principal ones are *Cypripedium candidum* and *pareiflorum*, *Aletris farinosa*, *Lilium Philadelphicum* and *superbum*, *Scilla Fraseri*, *Opuntia Rafinesquii*, and *Mertensia Virginica*. The author also states that as prairies were converted into fields the annual fires were soon stopped and as a consequence, in a few years a thick growth of young trees has sprung up, a view which, although it may be correct for a few localities, Prof. J. D. Whitney in recent numbers of the American Naturalist teaches us must be scouted as accounting for the general distribution of the prairie regions. Of course it would be tedious and useless to try to enumerate all the interesting plants listed in this catalogue and we can only refer those interested on the subject to the State publication in which this report occurs.—J. M. C.

Some Iowa Plants.—At the suggestion of friends, in the interest of science, I send you the following names to be added to the Catalogue of Iowa plants. To simplify, we class them by the years in which they were discovered.

1876. To begin, let us note, in the interest of comparative botanical science and the geographical distribution of plants, that those marked with a star (*) do not occur in Prof. Aughey's Catalogue of Nebraska plants, in the rarity and number of which we may feel a certain state pride. I have specimens of all named, and many to spare in most cases.

*Trifolium reflexum**, L., June 26th, old channel of Cedar River, at the bridge five miles above Cedar Rapids, perhaps floated down from Minnesota.

*Œnothera pumila**, L., 26th June, railroad grade, and dry, steep banks, near the above locality.

Penstemon albidus, Nutt, 26th June, near water at the base of the high railroad grade, one mile above Cedar Rapids. Truly fine and rare.

Fraïchia Floridana, Moquin, 13th September, street near the river, Cedar Rapids.* Quite rare.

To which I may add an introduced plant found by Prof. McAfee on the College grounds, *Lotus corniculatus*,* L. How introduced we can only imagine.

Sonchus oleraceus,* L., 13th September, street, Cedar Rapids.

Silene nocturna,* L., Ames, self-introduced, C. Lambs.

Æthusa Cynapium, L., streets and yards, Ames.

Croton monanthogynum, Mich., C. & N. W. R. R. grade, College farm, west end of the last bridge between Ames and College, August 1st. A rare plant, confined to said locality. I should not omit to say I found *Gratiola Virginica* only two miles north of Vinton.

Lathyrus ochroleucus and the very rare variety of *Purple Achillea*, five miles north of Cedar Rapids along the railroad track.*

1875. *Cnicus benedictus*,* L., Woodbine and Ames. (Int.)

Astragalus Plattensis, Nutt., Mo. Valley Junction and Crescent City, sand bluffs, Harrison and Pottawattamie counties, Iowa.

Lespedeza violacea, Pers., Keokuk Cemetery, 1866. This is indigenous and common there.

Lathyrus palustris, var. *myrtifolius*,* Muhl., Woodbine, hazel brush.

*Eupatorium album ?** Woodbine and Ames.

Euphorbia cyathophora, Jacq., Woodbine, new street, Cedar Rapids, and banks of Squaw creek, Ames.

Chenopodium glaucum, L., streets of Keokuk, 1866, and Dunlap, Harrison county.

Populus angulata, Ait., our White Cottonwood. Common throughout the state.

Archangelica hirsuta, Torr. and Gray, deep ravine, Mo. Valley Junction, Harrison county.

Caragana arborescens, Gray, Dea. Kingsbury's, Ames, and common in Ames, also at the College.

Ammania latifolia,* L., near Woodbine, muddy brooks, in deep ravines; scarce seen in different localities in two successive years.

Carex varia, Muhl., everywhere; our earliest species.

Andropogon Virginicus, L., Woodbine to Ames.

Vilfa aspera, Beauv. Railroad, Ames to Woodbine.

Panicum amarum, Ell., prairies and railroad, Woodbine to Ames.

Eatonia Pennsylvanica, Gray., abounds from Crescent City to Ames; a beautiful grass.

Glyceria fluitans, R. Brown, 1876; ditches, Ames, at Stearn's and Bacon's, one mile north of Ames. Another beautiful, rare grass.

Besides these the writer may claim to have added to the *printed* catalogue of Iowa plants, the following, as they are all confined to the Mo. River slope, where he spent eight years in diligent research.

Oxybaphus albidus,* Sweet. Rare, on grade of Sioux City R. R., near Mo. Valley Junction.

Oxybaphus angustifolius, Sweet. Rare and growing with the above; also near Dennison, Crawford county.

Chenopodium ambrosioides,* L. One locality alone between Logan and Magnolia, Harrison county, roadsides.

Euphorbia hexagona, Nutt., growing with or near *Euphorbia serpens*,* H. B. K. Common *only* on sandy grade of the Sioux City Railroad, near Mo. Valley Junction.* I only *thought* I saw *E. serpens* ten miles up Boyer Valley.

Aplopappus spinulosus, DC. (Small form, Gray). Common on the steep sand bluff at Mo. Valley Junction.

Rosa lucida, Ehrhart, with a var., very glandular, hairy all over capsule and calyx, which ought to be called *R. lucida*, var. *glandulosa*.

Tradescantia rosea, Vent., abounds along C. & N. W. R. R. from Ames to Woodbine; while *T. Virginica* abounds in its glory, rank and gorgeous, in Cedar River Valley,

but nowhere west of that. The latter is three times the height of the former, and constantly *deep blue.*

I was surprised to see the difference in grasses here from those of the rich, alluvial valleys of the west of the State; *Agrostis scabra*, Willd., *Aristida gracilis*, Ell., *Festuca tenella*, Willd., and *Sporobolus heterolepis*, Gray, *all* indicative of a thin soil and just suited to our decomposed Iowa-granite sub-soil. Hence I fear, botanical science with the geographical distribution of plants, most exactly confirms the exhibit of Iowa soils at the Centennial—making that of Story county the thinnest of all; a fact confirmed by abounding *Juncus tenuis* and *Artemisia Canadensis*, both unknown farther west. I think I make out in Story county these four *Salices* which do not occur in the west of the State, viz.: *Salix humilis*, *S. petiolaris*, *S. sericea* and *S. eriocephala.* The willows are a notoriously difficult family, but, after careful study and search during the season, I am fully satisfied there are no "Red" or "Diamond Willows" in Story county, nor anywhere east of the "Divide" at the head of Boyer Valley. I am equally convinced that they are NEW SPECIES, and not at all *Salix cordata* with a var. *myrtifolia.* With all their greater need of timber for posts, the common-place pioneers of Mo. River Valley *could not* have discovered in 20 years what the "live Yankee" had not discovered in 250 years in the east, *that these willows were as durable as Red Cedar* for fence posts! How long shall we wait for names to be assigned by the Masters? Or, shall we who alone have the tree, alive, or in lumber, to study with all due care, call them *Salix rhomboidea* and *Salix rhomboi-indentata*? For *both* species are *noted* for their diamond-shaped depressions in root and trunk, from which our most unique canes are made.—ROBERT BURGESS, *Ames, Iowa, Nov.*, 1876.

Obituary.—We regret to announce to our readers the death of Professor Herbert E. Copeland, teacher of Natural Sciences in the Indianapolis High School. The sad event occurred on Tuesday, Dec. 12th, and was caused by his devotion to his favorite studies. About 3 weeks before his death while he was fishing in one of the streams near Indianapolis to secure specimens for his scientific work, he fell into the water, and by this means contracted a severe cold. This was followed by an attack of brain fever, which later changed into the typhoid form, terminating in death. He leaves a wife and two small children. Professor Copeland was an enthusiastic student of the Sciences, and his successes in the class room and with the pen, gave promise of a brilliant future. In him the GAZETTE loses one of its firmest friends and most constant contributors. At the time of his death he had in preparation several articles which would have appeared in subsequent numbers.

RECENT PUBLICATIONS.—*The American Journal of Science and Arts*, November.—Dr. Gray reviews the Proceedings of the American Association for the Advancement of Science, Botanical Articles. He remarks that these are few and not of high importance.

The American Naturalist, November.—Dr. Geo. H. Perkins contributes an interesting article on the "Hygiene of House Plants," in which he assures the lovers of flowers that house plants are physically, intellectually and morally healthful. He states that they are injurious only as they increase the carbonic acid in the air, and as they give out injurious perfumes. He shows that both these effects are counterbalanced and that house plants are positively useful, "as they pour aqueous vapor into dry air, as they demand plenty of light and air, and on this account many a room, otherwise dark and unwholesome, is well lighted and aired." An interesting series of observations are given upon the growth of the flower-stalk of the Hyacinth, by A. W. Bennett, which go to prove that the "greatest energy of growth is displayed by the apical portion of the peduncle or that immediately beneath the flower-bud, the energy apparently decreasing regularly towards the base of the flower-stalk."

The Gardener's Monthly, November.—Two handsome California plants are described, *Tritelia laxa* and *Brodiæa coccinea*. Accompanying the description of the latter species is an excellent figure of the flower cluster and it promises to become one of our handsomest cultivated plants. The articles of this Magazine are so numerous and varied that we can not even name them, nor select the most prominent, for all are interesting.

Field and Forest, November.—The Flora Columbiana has been brought down among the *Gramineæ*, having stopped in this number with the genus *Eatonia*.

Bulletin of the Torrey Botanical Club, October.—Geo. E. Davenport mentions some peculiar variations of *Aspidium Thelypteris*, Swz. W. R. Gerard states that the fungi *Rhytisma Solidaginis*, and *R. Asteris*, which occur on the leaves of *Solidago* and *Aster*, have turned out to be insect galls.

Home and School, October.—John Williamson describes and figures *Trichomanes radicans*, found at Rock-castle Springs, Ky., by Mrs. Yandell. There are five figures, giving a general view of the plant, and magnified views of the fruit receptacle and sporangia.

A Catalogue of the Forest trees of the United States, by Geo. Vasey, M. D.—This pamphlet is meant to illustrate the "collection of forest-tree sections on exhibition by the Department of Agriculture at the Centennial Exhibition." Sixteen feet is used as the point where a shrub becomes a tree. The pamphlet contains 38 pages giving the range and a few of the prominent characteristics of 419 trees. The two largest genera are the oaks and pines, each of which embrace about 30 species. In getting together the material for this exhibition, which was an immense labor, requiring great skill and patience, and which reflects so much credit upon the Department and its Botanist, four or five species unknown to our flora were obtained. "These are mainly in South Florida, and include two exogens, viz., an *Anona*, or Custard Apple, and a *Chrysophyllum*, or Star Apple; and one endogen, a Palm of the genus *Thrinax*."

Cereus grandiflorus and Cereus Bonplandii, by Richard E. Kunze, M. D.—This paper was read by Dr. Kunze before the Eclectic Medical Society of New York State. It contains a fine colored plate of each species and gives their history, description and therapeutical application.

VARIATIONS IN THE SIZE OF ASTERS. Although prevented by the nature of my work from a full study of the flora of Northern Indiana, yet in my walks along the Wabash and Eel or along one of our railways I can not help being struck with the rich reward a careful study of our fall Compositæ would yield to the zealous student. On every side we see the golden *Solidago*, bending its graceful head in conscious knowledge of its beauty, or the *Helianthus*, standing boldly erect, as if it held the soil by right. Scattered in their midst gleams the bright purple and blue *Asters*, while in almost every sodded nook and corner the bright *Taraxacum* turns toward you its cheerful face. In walks merely for pleasure at the close of a day's labor, many minor points escaped attention, yet one fact struck me particularly in regard to the *Asters*, and that was the little attention they paid to the manual as regards their size. For example *Aster dumosus*, L., said to be from 1°—3° high, very rarely falls below 4° and I have seen it six. Again *Aster ericoides*, L., instead of being from 1°—1½° high, ranges from 2°—4°. On the other hand an *Aster* which I judge to be *A. tenuifolius*, L., is very rarely found 2° high, and yet that is the minimum given in Gray's manual. M. S. C.

All communications should be addressed to

John M. Coulter, Hanover, Ind.

M. S. Coulter, Logansport, Ind.

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GILIA KENNEDYI, n. sp.—Pubescent with spreading jointed hairs; dwarf, 1–4 inches high, branching from near the base; branches strict, ascending, fastigiate-corymbose; leaves opposite, palmately 3–5 parted, the divisions filiform or acerose, 3–5 lines long; flowers scattered below and crowded on the ends of the branches, yellow; peduncles very short, a line or less in length; calyx deeply parted, the divisions with filiform green ribs and broad white- scarious margins below; lobes of the corolla obovate, erose-denticulate, thrice as long as the short (2 lines long) campanulate tube, a dark-purple crescent-shaped spot on the inside of the throat at the base of each lobe and a lighter purple ring in the lower half of the tube; filaments inserted a little above the middle of the tube, glabrous; anthers exserted; seeds with a mucilaginous coat not emitting spiral threads.

Collected for Dr. J. T. Rothrock in Kern County, California, in the spring of 1876, by Mr. William L. Kennedy, for whom it is named.—THOS. C. PORTER, *Easton, Pa.*

ILLINOIS LICHENS.—Mr. J. Wolf, of Canton, Illinois, has zealously collected the Lichens of his region for several years, and the following list is made up from the specimens sent to me. The district appears to be quite rich in earth lichens, some of which are rare and interesting, and the search for which would doubtless be profitable, and in rail lichens belonging to the genera *Lecidea* and *Biatora*, which are peculiarly subject to be modified by this substrate, and thereby rendered difficult to determine. There are also in the same habitat many small fungi which simulate lichens so closely that that they can safely be distinguished only by the microscope.

Ramalina calicaris Fr.

Cetraria ciliaris Ach.

Alectoria jubata (L.) var. *chalybeiformis* Ach.

Theloschistes parietinus (L.) Norm.
concolor (Dicks.)

Parmelia perlata (L.) Ach.
perforata (Jacq.) Ach. var. *crinita* Tuck.
tiliacea (Hoffm.) Flk.
Borreri Turn.
saxatilis (L.) Fr.
olivacea (L.) Ach.
caperata (L.) Ach.

Physcia speciosa (Wulf., Fr.) var. *hypoleuca* Ach.
stellaris (L.) Nyl.
? *cæsia* (Hoffm.) Nyl.
obscura (Ehrh.) Nyl.
aulvcrulenta (Ehrh) Nyl.

Pyxine cocœs, (Sw.) Nyl., var. *sorediata* Tuck.

Peltigera canina (L.) Hoffm.

Heppia Despreauxii Mont.

Pannaria molybdæa (Pers.) Tuck., var. *cronia* Nyl.
nigra (Huds.) Nyl.
byssina (Nyl.) Tuck.

Collema pycnocarpum Nyl.
cyrtaspis Tuck.
nigrescens (Huds.) Nyl.
pulposum, Bernh.
limosum (Ach.) Nyl.

1— ——

Leptogium pulchellum (Ach.) Nyl.
tremelloides (L. fil.) Fr.
chloromelum (Sw.) Nyl.
subtile Nyl.

Placodium vitellinum (Ehrh.) Hepp.
aurantiacum (Lightf.) Næg.
cerinum (Hedw.) Næg.
siderítis Tuck.
camptidium Tuck.
ferrugineum (Huds.) Hepp.

Lecanora subfusca (L.) Ach.
varia (Ehrh.) Fr.
clatina Ach., var. *ochrophæa* Tuck.
cervina (Pers.) Sommerf., var.
pruinosa Ach.

Rinodina Ascociscana Tuck.
sophodes (Ach.) Mass.
alboatra (Hoffm.)
constans (Nyl.) Tuck.

Pertusaria velata (Turn.) Nyl.
pertusa (L.) Ach.
leioplaca (Ach.) Schær.
pustulata (Ach.) Nyl.

Conotrema urceolatum (Ach.) Tuck.

Gyalecta pineti (Schrad.) Tuck.
2 *trivialis*, n. sp.

Cladonia turgida (Ehrh.) Hoffm.
pyxidata (L.) Fr.
fimbriata (L.) Fr.
gracilis (L.) Fr.
squamosa, Hoffm.
furcata (Huds.) Fr.
mitrula Tuck.
rangiferina (L.) Hoffm.
macilenta Hoffm.
cristatella Tuck.

Biatora convoluta (Hoffm.) Fr.
? *flexuosa* Fr.
3 *russula* (Ach.) Mont.
sanguineo-atra (Fr.) Tuck.
exigua (Chaub.) Fr.
uliginosa (Schrad.) Fr.
peliaspis Tuck., incd.
4 *rudis*, n. sp.
5 *atropurpurea* (Mass.) Tuck.
6 *rubella* (Ehrh.) Rabenh.
chlorantha Tuck.
cyphalea Tuck.
geophana Nyl.
fossarum (Duf.) Mont.
resinæ Fr.

Lecidea myriocarpoides Nyl.

Buellia parasema (Ach.) Kbr.
myriocarpa (DC.) Mudd.

Opegrapha varia (Pers.) Fr.

Graphis scripta (L.) Ach.
dendritica Ach.

Arthonia pyrrhula Nyl.
lecideella Nyl.
patellulata Nyl.
7 ? *dispersa* Nyl.
astroidea (Ach.) Nyl.
punctiformis, Ach.
spectabilis Flot.
tædiosa Nyl.

Mycoporum pycnocarpum Nyl.

Calicium roscidum (Flk.) Nyl. var. *trabinellum* Nyl., and var. *drosodes* Tuck. incd.
subtile Fr.
trachelinum Ach.

Endocarpon arboreum Schwein.
pusillum Hedw.

8 *Thelocarpon* [*Segestria*] *Laureri* Flot.

Sagedia lactea Kbr.

Verrucaria epigæa, Pers., Ach.
nigrescens Pers.
rupestris Schrad.

Pyrenula thelena (Ach.) Tuck.
punctiformis (Ach.) Næg.
gemmata (Ach.) Næg.
leucoplaca (Wallr.) Kbr.
glabrata Ach.
nitida Ach.
lactea (Mass.) Tuck.

NOTE.—1. A curious Collemaceous plant was sent me by Mr. Wolf, which seems to be new. It occurs on the earth and when dry looks like a thin, black crust, much resembling the nostoc which occurs in similar situations. When wet it becomes brown and swells like a *Collema*, and has the internal structure of the Genus. Several specimens were sent me, but only one small one was fertile. It has small, lacunorine apothecia. The spores are simple, ovoid, about 14 thousandths of a millimetre in length. It is much to be desired that more fertile specimens should be obtained, and submitted to some competent botanist to determine. It may be near *C. myriococcum* Ach.

2. This is a new species, which has only occurred before, in very small quantity, in New Bedford, Mass. It occurs on the earth, and is the smallest known Gyalecta and hardly to be detected except when the earth is moist. Additional specimens would be very acceptable. Mr. Wolf seems to have found it but once in small quantity.

3. A single specimen of this species occurred on honey locust. It is a Southern lichen, but has been found in Massachusetts.

4. A new species, which was first found in New Bedford, Mass. It has very numerous, black apothecia, and large spores. Mr. Wolf states that it is abundant.

5. The plant occurred on rails and is obscure and doubtful, but it has the spores of the species.

6. Various forms of this polymorphous species were sent. Most of them were blackened conditions on rails. Var. *inundata* occurred on rocks.

Several specimens of *Biatora* on rails remain uncertain

7. The specimen did not furnish spores, but has the external appearance of this species, which has occurred in Massachusetts.

8. On rails. The first discovery of this pretty lichen in America is due to Mr. Wolf. It may also occur on the earth.—H. Willey.

Calochortus Kennedyi, n. sp.—Stem 6–18 inches high, simple, with 3 to 4 linear leaves, the lowest much longer (6 to 8 inches) than the others; umbel 2 to 4 flowered; peduncles 2 to 6 lines long; outer segments of the perianth ovate, cuspidate or acuminate, on the outside pale green with white scarious margins, on the inside scarlet-red, 9 to 10 lines long; inner segments broadly cuneate, bright scarlet red, except a purple spot just above the base bearded with a few scattered hairs, 1 to $1\frac{1}{4}$ inches long; anthers lance-oblong, 3 to 4 lines long, purple; filaments triangular, about 1 line in length; capsule lanceolate, tapering upward, $1\frac{1}{2}$ to 2 inches long.

The brilliant scarlet color of the perianth suggests the iodide of mercury.

Collected in Kern County, California, in the spring of 1876, by Mr. William L. Kennedy, and named in his honor at the request of Dr. J. T. Rothrock.—Thos. C. Porter, *Easton, Pa.*

Changes in Botanical Nomenclature.—Since the publication of the last edition of Dr. Gray's Manual of the Botany of the Northern United States, changes in the names of a number of plants contained therein have been made, and, thinking it may be of service to the many botanists who use that excellent work, I send you a list of such as have fallen under my observation.

Viola pubescens, Ait., var. *scabriuscula*, T.&G.—*V. glabella*, Nutt.—Brewer & Watson, in Bot. Calif., 1. p. 57.

Spiræa opulifolia, L.—*Neillia opulifolia*, Benth. & Hook., Gen., 1. p. 612.

Ribes hirtellum, Mx.—*R. oxyacanthoides*, L.—Brewer & Watson, in Bot. Calif., 1. p. 206.

Œnothera sinuata, L., var. *humifusa*, T. & G.—*Œ. humifusa*, Nutt.—Watson, in Proc. Am. Acad., 8. p. 580.

Antennaria margaritacea, R. Br.—*Anaphalis margaritacea*, Benth. & Hook., Gen. 2. p. 303

Cirsium lanceolatum, Scop.—*Cnicus lanceolatus*, Hoffm.—Gray, in Proc. Am. Acad. 10. p. 39.

Cirsium arvense, Scop.—*Cnicus arvensis*, Hoffm.—Gray, l. c., p. 39.

Cirsium pumilum, Spreng.—*Cnicus pumilus*, Torr.—Gray, l. c., p. 40.

Cirsium horridulum, Mx.—*Cnicus horridulus*, Ph.—Gray, l. c., p. 40.

Cirsium muticum, Mx.—*Cnicus muticus*, *Ph.*—Gray, l. c., p. 41.

Cirsium Virginianum, Mx.—*Cnicus Virginianus*, *Ph.*—Gray, l. c., p. 41.

Cirsium altissimum, Spreng.—*Cnicus altissimus*, Willd.—Gray, l. c., p. 42.

Cirsium discolor, Spreng.—*Cnicus discolor*, Muhl.—Gray, l. c., p. 42.

Cirsium Pitcheri, T. & G.—*Cnicus Pitcheri*, Torr.—Gray, l. c., p. 42.

Mulgedium pulchellum, Nutt.—*Lactuca pulchella*, DC.—Bot. Calif., 1. p. 442.

As Dr. Gray has followed Bentham & Hooker in merging the genus *Mulgedium* into *Lactuca*, our other species may be named thus:

Mulgedium Floridanum, DC.—*Lactuca Floridana*, Gaertn.

Mulgedium acuminatum, DC.—*Lactuca villosa*, Jacq.

Mulgedium leucophæum, DC.—*Lactuca foliosa* (*L. leucophæa*, Gray, Bot. Calif., l. c., not of Sibthorp, DC. Prod., 7. p. 136.).

Lycopus Europæus, L., var., *sessilifolius*, Gray—*L. sessilifolius*, Gray.—Proc. Am. Acad., 8. p. 285.

Lycopus Europæus, L., var. *integrifolius*, Gray—*L. rubellus*, Mœnch.—Gray, l. c., p. 286.

Lycopus Europæus, L., var. *sinuatus*, Gray—*L. sinuatus*, Ell.—Gray, l. c., p. 286.

Phlox Carolina, L., var. *ovata*, Benth.=*P. ovata*, L.—Gray, l. c., p. 249.

Phlox procumbens, Lehm.=*P. amœna*, Sims.—Gray, l. c., p. 251.

Physalis viscosa, Gray's Man.=*P. Virginica*, Mill.—Gray, Proc. Am. Acad., 10. p. 65. The true *P. viscosa* of Linn. is a southern plant, which ranges from North Carolina to Florida.

Chenopodium album, L., var. *Boscianum*, Gray=*C. Boscianum*, Moq.—Watson, in Proc. Am. Acad., 9. p. 94.

Rumex Britanica, L.=*R. altissimus*, Wood.—Gray, in Proc. Am. Acad., 8. p. 399.

Rumex orbiculatus, Gray=*R. Britannica*, L.—Gray l. c.

Chenopodium glaucum, L.=*Blitum glaucum*, Koch.—Watson, l. c., p. 101.

Polygonum aviculare, L., var. *erectum*, Roth.=*P. erectum*, L.—Watson, Am. Nat., 7. p. 664.

The following changes in the genus *Carex* are found in Olney's *Carices Boreali-Americanæ:*

Carex crus-corvi, Shuttlew.=*C. Nuttallii*, Schw.

C. retroflexa, Muhl.=*C. rosea*, Schk., var., Olney.

C. canescens, L. var. *vitilis*, Boott=*C. vitilis*, Fries.

C. arida, Schw. & Torr.=*C. Muskingumensis*, Schw.

C. cristata, Schw.=*C. lagopodioides*, Schk., var. *cristata*, Carey.

C. cristata, Senw., var. *mirabilis*, Boott=*C. lagopodioides*, Schk., var. *mirabilis*, Olney.

C. adusta, Boott=*C. albo-lutescens*, Schw.

C. fœna, Willd., var.(?) *sabulonum*, Boott=*C. silicea*, Olney.—Proc. Am. Acad., 7. p. 393.

C. stramínea, Schk., var. *tenera*, Boott=*C. tenera*, Dew.

C. stramínea, Schk., var. *aperta*, Boott=*C. tenera*, Dew., var. *major*, Olney.

C. stramínea, Schk., var. *hyalina*, Boott=*C. stramínea*, Schk., var. *Crawei*, Boott.

C. Barrattii, Schw. & Torr.=*C. littoralis*, Schw.

C. vaginata, Tausch.=*C. panicea*, L., var. *refracta*, Olney.

C. Meadii, Dew.=*C. panicea*, L., var. *Meadii*, *Olney.*

C. tetanica, Schk.=*C. panicea*, L., var. *tetanica*, Olney.

C. Crawei, Dew.=*C. microdonta*, Torr.

C. æstivalis, M. A. Curtis=*C. virescens*, Muhl., var. *æstivalis*, Olney.

C. Œderi, Ehrh.=*C. viridula*, Mx.

C. polymorpha, Muhl.=*C. panicea*, L., var. *scariosa*, Olney.

C. rotundata, Wahl.?=*C. miliaris*, Mx., var.? Olney.—Thos. C. Porter, *Easton, Pennsylvania.*

Cuscuta racemosa.—That "new" *Cuscuta racemosa*, the Alfalfa-Dodder, was, after all, not new to Prof. Thurber and to the readers of the "American Agriculturist." By an unpardonable oversight his article in the number of December, 1874, of that journal adorned with a cut, was overlooked not only in the notice published in the "Gazette" of January, but also in the Flora of California, published last summer. It seems that the parasite has made its appearance in California at least three years ago on Luzerne fields and its nature and dangerous character was recognized by Prof. Thurber and the means indicated to eradicate it. The little notice of this plant in the January number of the Gazette has elicited the information from California that the parasite is "now well naturalized here (about San Francisco Bay), and is a great pest among the Chili clover."—G. E.

Forking Ferns.—In the Nov. number of the Gazette a correspondent gives an instance of the forking of the fertile spike of *Botrychium Virginianum*, Swz. (This is the correct orthography, and it should always be so written. *B. Virginicum* is the later orthography of Willdenow, and not of Swartz.), and refers it to an injury received by

the plant when growing. I have observed the same phenomena, and apparently from the same cause, in other species, but it sometimes occurs when the plant has not received any injury. I have a specimen of *B. Virginianum* with two perfect fertile spikes, the common stalk forking just above the union with the sterile frond. The tendency to fork on the part of our ferns I have found to be quite common. I have noticed and received from correspondents, numerous specimens of the different genera and species. Some curious examples occur in *Camptosorus*, some specimens forking directly from the simply auricled base, making a double frond, and others forking from the long-attenuated tips.

In *Dicksonia* I have observed specimens in which not only the frond but the pinnæ also were forked.—Geo. E. Davenport.

Aspidium spinulosum, Swz.—What makes varieties? I do not know that I clearly apprehend the meaning of your correspondent who in the Nov. number inquires if his specimen of this species may not be "another of the many plants where the so-called 'varieties' are merely forms with individual instead of local peculiarities," but I have always supposed that it was individual peculiarities that made varieties. A plant that depended altogether upon local influences for its character would be very apt to run back into the normal form of the species on being removed from those local influences and such a plant I should not consider as a variety at all. If it be local pecularities that make varieties then how does it happen that all of the plants growing within the ranges of the same local influences are not always of the same character? Within an area containing at least half an acre of *Aspidium spinulosum*, in the vicinity of Boston, I find many forms of *spinulosum* all growing together and subject to the same local influences, and I fail to see how two plants of one species growing side by side, under precisely the same influences, can have two distinct forms if it is local influences alone that make their peculiarities. Rather I should say that these peculiarities came from some cause inherent in the plants themselves and that, therefore, it is individual and not local peculiarities that make varieties.—Geo. E. Davenport.

Pyrus Americana, DC.—This beautiful tree makes its home in central Pennsylvania near the sumit of the mountains, marking with uniformity a line of about 1,300 to 1,400 feet above tide. As you climb the steep ascent of Tussey and Bald Eagle mountains, among masses of broken rocks covered with lichens, a trio of beautiful small trees attracts your attention—*Pyrus Americana*, DC., *Betula papyracea*, Ait., with its white bark and graceful spray, and *Acer Pennsylvanicum*. These all seem to love a lofty exposure, and thrive on the scanty debris of shattered rocks. *Acer Pennsylvanicum* is often met with at lower elevations. Ascend either of these mountains in their trend to the north east through Huntingdon and Centre counties, your approach to their summit is heralded by clumps of the Birch and *Pyrus Americana*. There is, however, a marked exception to this habitat of high exposure. The *Pyrus Americana* makes a sudden descent of about 700 feet to the base of Tussey Mountain. Two miles east of Spruce Creek Station on the Pennsylvania Rail Road a small colony of a dozen bushes, dwarfed to six feet in height, is found growing over an area of a half acre of rocks. The reason for this departure from the usual elevation of the tree is found in the fact that below these rocks perpetual ice creates a cold atmosphere. This interesting locality, sheltered from the direct action of the sun by the precipitous mountain side and the erosion in it made by water action in an earlier era, has the cool, damp atmosphere of ice in the warm days of August. The ice is concealed by rocks covered with a vigorous growth of mosses, shrubs and trees, and is found [in August] some three feet below the surface.

In the same locality grows *Pinus Strobus*, L., *Abies Canadensis*, Michx., *Mitchella repens*, L., *Rubus strigosus*, Michx., *Fragaria vesca*, L., *Ribes prostratum*, L'Her., *Heuchera pubescens*, Pursh.—J. R. L.

CLAYTONIA VIRGINICA.—I was pleased to note that my remarks on *Claytonia* have led to a comparison of notes. I trust that observations of this and other plants will be made next season. Dimorphism in *Claytonia* is new to me. In *Epigæa repens*, *Mitchella* and others I have noted it, and made record there of many years ago in the *Proceedings of the Philadelphia Academy*. It would be, I think, a service to science if Mr. Wheeler would endeavor to ascertain next season how the flowers of No. 2 are fertilized? What insect, if any, visits them? And how they work as regards fertilization? It would also be worth looking at again to see whether "different stems grow from one tuber." My memory seems to say that only one stem grows from one tuber, but I may be wrong.

Albinos are not unusual in all blue flowered plants. I found a white *Brunella vulgaris* last year. Scarlet more rarely produce white flowers, but I never found a species normally white, with blue or red ones. Has anybody seen such? It seems easier to lose color than to regain it.—THOMAS MEEHAN, *Germantown, Phila.*

BOTANICAL RAMBLES IN EAST FLORIDA. (*concluded.*)—It was my great desire, at the earliest possible time, to reach the head waters of the Kissimee and the "Indian River Country," and return north with the increase of the temperature, but the unusually dry season rendered the navigation beyond this lake impracticable, which obliged me, though reluctantly, to retrace my course with the hope of reaching by rail and the Gulf a more southern latitude. Leaving the St. John's River country until July, on my homeward way, a desire to see the old Spanish town of St. Augustine led me to return. On June 30th, at Tocoi, awaiting the arrival of the cars, my leisure time was occupied in securing specimens of *Eryngium aromaticum*, Baldw., *Euphorbia telephioides*, Chapm., *Nolina Georgiana*, Michx., and *Fimbristylis stenophylla*. It was but thirty minutes ride and the quaint old town of Menendez came in view. I was impressed with its cleanly appearance, no rubbish or weeds of any kind in the long narrow streets, not even plants for botanical specimens, except, here and there, close to the walls of the houses, depauperate specimens of *Senebiera didyma*, Pers., and *Euphorbia maculata*, L., struggling for life. I had been somewhat disappointed here in my botanical prospects on account of the distance of interesting ground. After collecting in the lots *Parthenium Hysterophorus*, L., and *Alternanthera Achyrantha*, R. Br., my attention was directed to the beach and Anastasia Island, both extremely barren, yet not devoid of interest. On the former grew *Houstonia angustifolia*, Mx., *Bumelia lanuginosa*, Pers., *Gilia coronopifolia*, Pers., *Batatis littoralis*, Chois., *Atriplex arenaria*, Nutt., *Cyperus Nuttallii*, Torr., *Iva imbricata*, Walt., *Helianthus debilis*, Nutt., and *Ipomœa Acetosellafolia*. On the latter was seen *Dodonæa viscosa*, L., *Arenaria diffusa*, Ell., *Chiococca racemosa*, Jacq., *Panicum gibbum*, L., and *Frangula Caroliniana*, Gray. The last, bearing an abundance of red berries, appeared conspicuous and ornamental among the dwarfed live and water oaks. Here are the quarries of the Coquina rock of which the historical Fort Marion was built over two centuries ago.

An equable temperature is claimed for this coral state, and no doubt correctly. My thermometrical records for the 3d, 4th and 5th of July show only 85° to 88° F. in the shade, yet the rays of the mid-day sun at this season are uncomfortably hot. I considered it prudent, therefore, to retrace my course northward and close my peregrinations in this "land of flowers." However, about an hour's walk from the St. John's River, the floral display became so inviting that with an intimation to the conductor he kindly let me off. The vegetation was extremely interesting in this wild pine land and it was much to my regret that the time was so short until the arrival of my steamer for Savannah. On account of the precious hours no time was wasted in preparing specimens of *Polygala fastigiata*, Nutt., *Psoralea virgata*, Nutt., *Petalostemon carneus*, Mich., *Ludwigia linifolia*, Poir., and *sphærocarpa*, Ell., *Rhexia stricta*, Pursh., *globella*, Michx., and *lutea*, Walt., *Helianthella tenuifolia*, T. & Gr., *Marshallia angustifolia*, Pursh., *Sabbatia macrophylla*, Hook., *chloroides*, Pursh., and *gentianoides*, Ell., *Asclepias tomentosa*, Ell., *Her-*

pestis amplexicaulis, Pursh., *Schœnolirion Elliottii*, Feay, *Juncus repens*, Michx., *Rhynchospora cephalantha*, Torr., and *fasicularis*, Nutt., *Scleria gracilis*, Ell., *Carex glaucescens*, Ell., and the handsome grass, *Ctenium Americanum*, Spreng., all of which were in a most excellent state for collecting.—Dr. A. P. Garber.

Some Plants of the Lower Wabash.—The following is a list of plants found in this vicinity during the past season, which are not included in my "*Catalogue of the Flora of the Lower Wabash Valley*," published in the *Geological Report of Ind.*, for 1875:

Helleborus viridis, L. Found in a fence-row, Feb., 15, in the last stage of flowering; evidently escaped from a garden near by.

Sagina apetala, L., June 10th, in bloom. Dry woods.

Psoralea melilotoides, Michx. Found in full bloom, May 3, in a low moist prairie.

Petalostemon candidus. Michx. Same locality as the last, June 10.

Desmodium rotundifolium, DC. Sandy soil; not in bloom.

Desmodium Canadense, DC. July—Sep.

Triosteum perfoliatum, L. Bottom-lands.

Lepachys pinnata, Torr. & Gray. I have observed this plant for several seasons, but until this, have always taken it to be *Rudbeckia laciniata*, L.

Dysodia chrysanthemoides, Lag. Along road-sides in considerable numbers; this appears to be a "new-comer" in our locality.

Artemisia annua, From Siberia ? Escaped from gardens; have found several specimens along road-sides during the past summer. Our amateur gardeners here call it "*Sweet Fern Plant*."

Nabalus racemosus, Hook. Moist prairie, Sep., 10.

Pedicularis Canadensis, L. April 13.—June 8.

Isanthus cæruleus, Michx. Sep. 20. The whole plant possesses an odor similar to *Monarda punctata*, L.; which I do not find mentioned in our text-books.

Lycopus Europæus, L. var.— Have found an interesting form of this exceedingly variable species this season growing on a bare *sand-stone cliff* with *Pellæa atropurpurea*, Link., which last is usually thought to be found only on calcareous rock. Leaves ovate-lanceolate, acuminate, coarsely serrate; runners from 2—6 ft. long, some of them bearing immature flowers.

Fraxinus pubescens, Lam. Low wet woods.

Quercus lyrata, Walt. This southern species was identified from imperfect specimens found several years ago; not having found it since, I had concluded that this was a mistake, and had dropped it from my catalogue of this vicinity; but this season I have discovered quite a number of trees within a few miles of *Mt. Carmel*.

Hybrid of Quercus imbricaria & Quercus falcata, Michx. During the past season I found a small fruitless oak-tree; from specimens of it sent *Dr. Engelmann* he thinks it a "*hybrid of imbricaria and probably falcata*." The leaves vary from entire to three to five falcate lobed.

Goodyera pubescens, R. Br. Rocky bluff.

Calopogon pulchellus, R. Br. Moist prairie, May 10, in full bloom.

Smilax hispida, Muhl. River-bottoms.

Vilfa aspera, Beauv. Hilly open woods.

Vilfa vaginæflora, Torr. Dry clayey hill-sides; Aug.—Oct.

Andropogon scoparius, Michx.

Andropogon Virginicus, L.

Sorghum nutans, Gray. The three last, with *A. furcatus*, Muhl. form the principal grasses of our prairies.

Azolla Caroliniana, Willd. In a "*Cypress Pond*."—J. Schneck, *Mt. Carmel, Ill.*

Fissidens decipiens, De Notaris.—Mr. Rau desires me to make this correction, as I had wrongly attributed this species to Mr. Austin. It is described in the Supplement to Sullivant's *Icones Muscorum*.—A. H. Y.

Recent Publications.—*American Naturalist*, December and January. In the former number is given an interesting communication from C. G. Pringle upon "Alpine and Subalpine Plants in Vermont." Many rare plants are found occurring on the Green Mountains, and Mr. Pringle thinks that the plants found there are much more alpine in character than they have heretofore been credited with being. A region is described which out-Willoughbys Willoughby itself. Among the rarer plants found are *Asplenium viride*, *Saxifraga Aizoon*, *S. aizoides*, *S. oppositifolia*, *Woodsia glabella*, *W. hyperborea*, *Calamagrostis Langsdorffii*, *Graphephorum melicoides*, and *Habenaria rotundifolia*. W. W. Bailey gives in popular language the differences between the two Bitter-Sweets *Solanum dulcamara* and *Celastrus scandens*. In the January number Dr. Gray proposes the term *heterogone* or *heterogonous* flowers for the old *diœco-dimorphism* of Torr. & Gr., Fl. N. Am., the *dimorphism* of Mr. Darwin, and the *heterostyled* flowers of Hildebrand. This term, expressing a difference in relative length or height of stamens and style, would have its counterpart in *homogone* or *homogonous* flowers to designate the absence of this kind of differentiation.

Bulletin of the Torrey Botanical Club, December. Mr. Leggett announces his intention of publishing monthly a "Calendar of Leaves," for the purpose of gathering facts on the subject of the habits of different shrubs and trees in shedding or retaining their leaves. A short account of the Torrey Herbarium and Library is given. The Herbarium numbers from seventy-five to eighty thousand species of plants made up principally by the collection of Dr. Torrey, estimated to contain 35,000 species, the Meissner Herbarium, and the Herbarium of Dr. Chapman. The Library contains about 1,300 volumes in all departments of Botany.

The *Index Seminum* of the Chicago Botanical Garden offers a fine list of seeds for exchange. H. H. Babcock, Director.

We take great pleasure in announcing that Dr. Joseph T. Rothrock, of Wilkesbarre Penn., has been unanimously elected Professor of Botany in the University of Pennsylvania. Through his experience both in field and herbarium work, he is a man well fitted for the position, and will undoubtedly reflect great credit upon himself and the institution which has done him this honor.

Having received and examined a set of Mr. Flint's Alpine plants we can cordially recommend them to our readers as being very satisfactory and at the same time very cheap. We take the following announcement from the American Naturalist:—Collections of the Alpine and sub-Alpine plants of the White Mountains, N. H., containing more than fifty species, have been made during the past season, by William F. Flint and J. H. Huntington. The number of sets is limited to fifty. They have been carefully arranged and ticketed, and will be sent by mail upon the receipt of five dollars [$5.00]. Address William F. Flint, Hanover, N. H. [Box 348.]

"Monographiæ Phanerogamarum."—M. Alphonse DeCandolle and his son, Casimir DeCandolle, are engaged upon the first volume of a work similar to the *Prodromus* which is to be entitled "*Monographiæ Phanerogamarum.*" It will contain the *Smilaceæ*, by A. DeCandolle, the *Meliaceæ*, by C. DeCandolle, and other families by other writers. They will consider the families not contained in the Prodromus, or those which have need of being elaborated anew.—J. M. C.

All communications should be addressed to

John M. Coulter, Hanover, Ind.

M. S. Coulter, Logansport, Ind.

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PRUNUS ALLEGHANIENSIS, n. sp.—A low shrub with straggling branches, 3 to 5 ft. high, but frequently assuming a tree-form and reaching a height of 12 ft. or more, seldom thorny; leaves oblanceolate to obovate, often long-acuminate, finely and sharply serrate, biglandular at base, softly and finely pubescent when young, glabrate when old, especially on the upper side; umbels 2 to 4 flowered, nearly sessile; pedicels and calyx finely pubescent; pedicels about ½ an inch long; clayx-tube narrowly obconic, 2 lines long, with the ovate-oblong, obtuse teeth a little shorter; petals round-obovate, 3 lines long; fruit globose-ovoid, under ½ an inch in the greater diameter and over ⅓ in the lesser, very dark purple, covered with a bloom; stone turgid, somewhat obovoid, with a blunt point, a shallow groove on one side and a broad flat ridge on the other.—In Huntingdon County, Pennsylvania, on the limestone bluffs of the Little Juniata, northward through the Barrens, and westward over the Alleghanies as far as the extremity of Boon's Mountain, Elk County, where it was found by the late Mr. McMinn. My attention was first called to this plum, years ago, by my friend, J. R. Lowrie, Esq., of Warriorsmark. From him and Miss N. J. Davis I have received good specimens in flower and fruit, and have also seen and collected it myself in various localities. It produces an abundance of fruit of a pleasant acid taste, known by the name of "Sloes" among the people of the region and sometimes used by them for making pies or preserves. It appears to be exempt from the attacks of the curculio or other insects. Although nearly allied to *Prunus maritima*, Wang., var. b., T. & G. (*P. pygmæa*, Willd.), its remoteness from the sea-board, its habitat on bluffs and mountains, its proportionally narrower and longer decidedly acuminate leaves, its smaller fruit, and especially the character of the stone, seem to entitle it to rank as a distinct species. —THOS. C. PORTER, *Easton, Penn.*

NOTES ON THE ARBOREOUS, ARBORESCENT AND SUFFRUTICOSE FLORA OF OREGON. —*Berberis Aquifolium*, Pursh and *B. nervosa*, Pursh. Both species about equally common in the woods of the lower Cascades; the latter scarcely arborescent above the ground, whilst the former forms a branching bush 2 to 3 feet high. The fruit of both species is used by the inhabitants, and is called in some localities "wild grapes."

Rhus diversiloba, T. & G. (*R. lobata*, Hook.) A low spreading bushy species having the fruit of *R. Toxicodendron* and otherwise resembling the upright form of that species.

Acer macrophyllum, Pursh. The large leaved maple abounds in many localities but chiefly near streams and in bottoms, attaining 3 feet in diameter, averaging 1 to 2, and from 40 to 70 feet high, but mostly with scrubby, gnarled trunks, affording very little clear lumber. Used in various manufactures and for fuel. Is much more valuable for the latter use than the *Coniferæ* and is probably equal to the oak. Though not abundant it is at present extensively used for the purposes mentioned.

Acer circinatum, Pursh. The Vine-Maple. So called from the habit of its growth, elongating its trunk without correspondingly increasing the diameter. This causes it to spread or grow horizontally on the ground or in an ascending position. It forms dense thickets on the margins of streams and on wet hill-sides almost inaccessible even to one on foot.

Pachystima Myrsinites, Raf. A low, bushy shrub, 1 to 2 feet high, in the Cascades, rather rare.

Rhamnus Purshiana, DC. A shrub of 6 feet to a tree 25 feet high and a trunk 4 to 6 inches. Fruits sparingly, not common.

Ceanothus Oreganus, Nutt. A shrub 6 to 8 feet high, in thickets on the Williamette River, conspicuous with numerous thyrsi of white flowers in May.

Ceanothus velutinus, Dougl. A bushy branching shrub, 2 to 3 feet high, in coniferous woods on the Cascades, not rare.

Prunus emarginata, Walpers, var. *mollis*, Brewer (*P. mollis*, Walpers.) The Oregon Cherry. This is a small tree remarkable for its great abundance in many mountain localities. Abounds also, sparingly, in the valleys. It is notable for its straight upright trunks, and for the thickness of its growth on the ground, the full capacity of the soil being monopolized by it over large areas. The trunks, from 1 to 4 or 5 inches in diameter, attain the height of 20 to 40 feet, often so dense that a pedestrian finds it difficult to pass through them. The fruit is small, red and not edible.

Prunus demissa, Walpers. A small bush, much resembling *P. Virginiana*, with larger but equally astringent fruit.

Nuttallia cerasiformis, Torr. & Gr. A shrub in thickets on the Williamette River, 4 to 6 feet high, bearing fruit in drooping racemes, the size and color of *Amelanchier alnifolia*, but not edible.

Neillia opulifolia, Benth. & Hook. (*Spiræa opulifolia*, Linn.) Abundant in the valleys, along streams, forming dense thickets.

Spiræa discolor, Pursh., var. *ariæfolia*, Watson (*S. ariæfolia*, Smith.). A shrub ordinarily 6 feet high, but attaining rarely 20 feet, and five inches in diameter. Of straggling growth and very conspicuous and ornamental in woods with its numerous large panicles of white flowers.

Spiræa Douglasii, Hook. An abundant shrub, 4 to 8 feet high, forming impenetrable thickets in the low lands of the valleys, highly ornamental in flower, with numerous dense panicles of rose purple flowers. Large areas of the best meadow land of the state are overgrown with this shrub and but little inroads have as yet been made upon its domain by the agriculturalists, its extermination evidently being a work of great difficulty.

Spiræa Douglasii, Hook., var. *Menziesii*, Presl. (*S. Menziesii*, Hook.) This is evidently the same as the foregoing, modified in its characters solely by its habitat—when growing in water it becomes the smooth *S. Menziesii*, of Hooker.

Spiræa betulæfolia, Pallas. A shrub one foot high, on the dry hills of the Cascades, with white flowers, and also subalpine in wet places, 4 feet high, with rose-red flowers. The two forms apparently merit specific distinction, but are united by authors. Both forms are rare and confined exclusively to the habitats mentioned.

Rosa blanda,, Ait. A species occurring in valleys is referred here with some doubt.

Rosa Californica, Cham. & Schlecht. A large species, forming thickets and clumps in the valleys. Grows 10 feet high and fruits abundantly. It is conspicuous in September with its dense clusters of oval pale-red fruit; flowers medium or rather small.

Rosa Kamtschatica, Vent. On low wet ground in the valleys, 2 to 4 feet high. Young branches and shoots densely clothed with a brownish pubescence, straight prickles and recurved spines. A strikingly coarse and unattractive species.

Rosa gymnocarpa, Nutt. This is the small flowered, small and sparsely fruited species on hills throughout.

Rosa pisocarpa, Gray. A recently described species, in wet places in the valleys, flowers medium, fruit very small and in clusters.

Rubus ursinus, Cham. & Schlecht. (*R. macropetalus*, Dougl.) On low, rather wet lands and river banks. Low and straggling, frequently trailing over logs and climbing on bushes. This is the blackberry of Oregon. It is in part diœcious or imperfectly di-

œcio-polygamous and is often met with entirely sterile, while other adjacent areas are immensely fruitful. It occurs abundantly in many localities, and affords large quantities of excellent fruit equal in value to our *R. villosus*.

Rubus leucodermis, Dougl. This is very similar to our *R. occidentalis;* on dry hills in the mountains; fruit somewhat larger and with smaller, less reticulate seeds than our species, and very probably might by cultivation be made to surpass the improved black cap raspberry of the eastern states.

Rubus spectabilis, Pursh. This is the "Salmon-berry" of the inhabitants. Grows on the banks of streams, generally in the hilly districts. The fruit is not produced plentifully, but is rather large and juicy, pleasant tasted and sought after to some extent by the inhabitants. When fully ripe it is pale red and transparent. Sometimes it attains 10 to 12 feet high, with stems two inches in diameter.

Rubus Nutkanus, Mocino. On hill-sides in open coniferous woods, forming vast thickets, common and unimportant.

Pyrus rivularis, Dougl. This is the Oregon Crab-Apple, with fruit in clusters no larger than that of *Viburnum pruniifolium*, which it resembles in shape, and when ripe, in September, pale yellow. Not known to be of any economic use. The tree attains 15 to 20 feet and 2 to 4 inches in diameter, and abounds along streams rather sparingly.

Pyrus sambucifolia, Cham. & Schlecht. Occurs rarely in the high Cascades. A low bush.

Crataegus rivularis, Nutt. A low, spreading, bushy-headed tree or shrub, spiny, with smooth shining leaves. The fruit is abundant and black when mature, in August and September. It abounds along streams and in lowlands, and is so abundant in places as to be a serious impediment to the clearing of the best agricultural lands.

Crataegus Douglasii, Lindl. A much rarer, larger tree; in the valleys; with larger, incised, doubly serrate, or sometimes lobed, leaves and strong spines

Amelanchier alnifolia, Nutt. This is the Oregon representative of the eastern "Service Berry"; not attaining to tree porportions so far as observed, fruiting abundantly on low bushes. The fruit when ripe, in August, on the Cascades, is black and highly prized by the mountain residents, being very sweet and pleasant to the taste.

Ribes Menziesii, Pursh. In the Cascade Mountains, rare. A low, spreading, bushy species, 3 feet high, remarkable for its large, densely prickly fruit, not available for any economic use.

Ribes divaricatum, Dougl. This is the Oregon representative of the eastern *R. rotundifolium*, much resembling it in mode of growth, in leaf and fruit, and affords the inhabitants a limited supply for tarts, etc.

Ribes setosum, Dougl. Wet Alpine woods; a low, spreading bush; fruit prickly and of no value.

Ribes sanguineum, Pursh. In the valleys and low hills; a shrub 3 to 6 feet high, highly ornamental in flower, bearing a profusion of large purple spikes in early spring. The fruit is slightly prickly, rather small, and not used as an edible fruit by the inhabitants.

Ribes bracteosum, Dougl. A remarkable species on the banks of shady streams in the lower mountains, with immensely large leaves and fruiting racemes sometimes a foot in length. Grows 6 to 8 feet high, with stems an inch in diameter. The peculiar currant odor is exhaled heavily from the plant and its presence can be detected by this alone several yards away. Fruit not edible.

Ribes aureum, Pursh. Sandy shores of the Columbia at the Dalles.

Ribes viscosissium, Pursh. Dry rocky hills of the Columbia at the Dalles. Grows in clumps, 4 to 6 feet high.

Philadelphus Lewisii, Pursh. A shrub of straggling growth, in open coniferous woods, 6 to 8 feet high, somewhat ornamental in flower.

Oplopanax horridum, Smith. A rare, low spreading, densely prickly shrub, like *Aralia spinosa*, and quite as formidable as the latter species to be overcome by the western explorer.

Cornus pubescens, Nutt. A shrubby species, in thickets, not attaining to tree proportions, resembling *C. sericea* of the eastern states.

Cornus Nuttallii, Audubon. This is the Pacific representative of our *C. florida* Attains 6 to 8 inches in diameter and 30 to 40 feet high, but generally much smaller and lower, very ornamental in May with its abundant white involucres. It differs from the eastern plant in its large, short peduncles, larger and more fleshy fruit, and its obovate, rather obtuse leaves.

Sambucus pubens, Michx. Thickets in the lower Cascades, a low bush and rare.

Sambucus glauca, Nutt. This is a tree attaining a foot in diameter, but low and spreading. The fruit when mature, in September, is covered with a dense white bloom, rendering the tree very ornamental, for which purpose it is planted to some extent by the inhabitants. The fruit is abundant.

Lonicera hispidula, Dougl. A small vine climbing on bushes, with small whitish and rose colored flowers.

Lonicera hispidula, Dougl., var. *vacillans*, Gray. This is in every way a much larger plant, climbing high on trees. It is smoother, with larger leaves and flowers of the same color.

Lonicera ciliosa,Poir. A species resembling *L. sempervirens* in mode of growth and leaf, but with larger, orange-red flowers. Would be handsome in cultivation. A scarce species, on banks of streams.

Lonicera involucrata, Banks. A shrub 3 to 4 feet high, in wet thickets, with inconspicuous yellow flowers.

Menziesia ferruginea, Smith, var. *globularis*, Salisb. A low straggling bush in wet Alpine woods.

Gaultheria Shallon, Pursh. A low shrub 1 to 2 feet high, often forming dense thickets in coniferous woods, with spikes of whitish and rose-purple flowers overtopping the leaves. It is very ornamental.

Gaultheria Myrsinites, Hook. This is a small species with inconspicuous flowers, in the high Cascades, 6 inches high.

Arbutus Menziesii, Pursh. This is a tree 30 or 40 feet high and 6 inches in diameter, quite rare in Oregon. It is notable in woods from its smooth, reddish-brown bark and large panicles of berries the size of peas.

Arctostaphylos Uva-ursi, Spreng. Abundant on the coast hills and generally distributed.

Arctostaphylos tomentosa, Dougl. A strong growing, straggling bush, 2 to 5 feet high, in the high Cascades forming dense clumps.

Arctostaphylos pungens, HBK. A lower shrub, with smaller leaves and flowers. Same habitat.

Vaccinium cæspitosum, Michx., var. *augustifolium*. A low bush 6 inches to a foot high, in low bushy plains, fruiting abundantly. This is the black huckleberry of the country and is much sought after by the inhabitants.

Vaccinium uliginosum, L. On the coast in sphagnous swamps, area limited, of little importance to the country.

Vaccinium ovalifolium, Smith. A straggling bush 4 feet high, in the Alpine woods of the Cascades. Fruits sparingly and is unimportant.

Vaccinium parvifolium, Smith. This is the red huckleberry of the region, and is a bush 3 to 6 feet high, in the lower mountains along streams and thickets in woods. The fruit though not abundant is rather large, sweet and pleasant to the taste. The limbs and branches are angled and of a beautiful green color and glossy.

Vaccinium Myrtillus, L., var. *microphyllum*, Hook. A straggling bush 4 to 6 feet high, in the Alpine woods of the Cascades, rare, fruit scarce and unimportant.

Vaccinium ovatum, Pursh. Sand hills on the coast. A shrub 1 to 3 feet high, abundant and exceedingly fruitful. Large quantities of the fruit are collected by the Indians and sold to the inhabitants, but it is inferior in quality to that of other species.

Rhododendron Californicum, Hook. A large shrub in subalpine woods of the Cascades, 4 to 10 feet high, bearing large flowers, very ornamental.

Rhododendron albiflorum, Hook. A rare shrub, 3 feet high, in the Alpine woods of the Cascades, with inconspicuous flowers.—ELIHU HALL, *Athens, Ill.*

[*To be continued.*]

BRYOLOGICAL NOTES BY C. F. AUSTIN.—CERATODON MINOR, *n. sp.*—Facile dignoscitur a *C. purpureo*, cui cæterum simillimus, statura minore, foliis ob costam longissime excurrentem aristatis, pedicello tenuiore, capsula breviore, peristomii dentibus angustioribus lævioribus solum inframedium articulatis et (angustissime) marginatis.

West of the Frazer River, June 5th, 1875, *Macoun.*

Nearest to *C. purpureus*, var. *aristatus* AUST. *Musc. Appalach*, n. 117; but that is more robust; with longer stems; leaves with the stouter costa not so long excurrent; color of the whole plant paler (pedicel and capsule yellowish), and with the peristome as in the typical form.

In C. MINOR the stems are about 2 lines high. The very slender pedicel and shining capsule are of a dark red color. The annulus and operculum are about as in *C. purpureus*. The peristomal teeth are nearly of the same length but much narrower and neither articulated nor margined above the middle, very narrowly margined and with only about half as many articulations and but 2 or 3 cross-bars below the middle. Inflorescence as in *C. purpureus*.

CRYPHEA RAVENELII, *n. sp.*—Plantæ humilis sordido-virides; caule vix unciam longo julaceo subarcuato subsimplici, foliis siccitate appresis in humido apertis rotundo-ovatis concavis obtusiusculis opacis, margine plano integerrimo versus apicem subincurvo, dorso minutissime papilloso, costa validiuscula supra medium procedente apice subflexuosa et sæpe inæqualiter bicrura, reti obscuro granuloso minuto uniformiter brevi; ramulis fructifris brevissimis secundis, foliis perichætialibus pallidis arcte convolutis tenuis abrupte breviter acuminatis, costa tenui longe infra apicem evanida, capsula fere sessili ovali solidiuscula ore limbo lato solidissimo rubro circumcincta, peristomii dentibus 8 rubris solidis e basi lata subulato-filiformibus siccitate erecto-incurvis in humido erecto-adpressis valde noduloso-articulatis in medio linea divisurali notatis pertusisque, ciliolis nullis, calyptra operculo annuloque haud visis: florescentia *C. glomeratæ*.

Rome, Georgia, *Ravenel.*

Resembles *C. glomerata*, but is readily distinguished by its obtusish opake granulose leaves not squarrose when moist, by its shorter and less abruptly pointed perichætial leaves not costate to the apex, by its shorter and more solid capsule with a broad solid rim and without a persistent annulus, by its solid red peristomal teeth erect-appressed when moist (slightly spreading in *C. glomerata*) and by the want of an inner peristome.

BARBULA RAVENELII, *n. sp.*—Plantæ parvæ sordido-flavescentes cæspitosæ rigidæ; caule 2–3 lineas longo erecto simplici, foliis siccitate crispis ovato et lanceolato-oblongis subcarinatis obtusiusculis et obtusis pro more minutissime apiculatis, apiculo paululum recurvo, margine infra medium angustissime recurvo, costa terreti percurrente, reti minuto haud granuloso basilari paulum majore et laxiore; cætera desunt.

On the earth, Georgia, *Ravenel.*

Resembles *B. unguiculata*, HEDW., but differs in its shorter more oblong not lingulate leaves, with the ordinary cells not granulose, the basal ones less pellucid etc. Costa minutely papillose on the back.

BARBULA? WOLLEI, *n. sp.*—Plantæ dense cæspitosæ, subfragiles, saturate virides; caule erecto subsimplici, foliis siccitate subcrispatis madefactis flexuoso-patentibus sublinearibus apice canaliculato excepto planiusculis paulo undulatis margine planis minutissime eroso-serratis apice subacuminato-acutatis, costa percurrente haud lutescente: flores et fructu ignoti. (An *Trichostomii* vel *Didymodontis* species.?)

Rocks in a ravine, near Bethlehem, Pennsylvania, *Rau*.

Intermediate in many respects between *Barbula cæspitosa* and *Didymodon cylindricus*. From the former it differs in its longer stems, rather broader less carinate less undulate and more fragile leaves, minutely erose-serrate on the margin, sub-acuminate by the incurved margins at the apex, rather less pellucid at the base, and with the costa neither pellucid when moist nor shining on the back when dry. From the latter it differs in its twice larger size, broader, less fragile accuminate erose-serrate leaves, etc.

TRICHOSTOMUM COLORADENSE, *n. sp.*—Plantæ pusillæ fusco-virides; caule tenui subflexuoso 2–3 lineas longo, foliis inferioribus remotiusculis superioribus congestis patulo-incurvis linealibus toto longitudine valde convolutis acutiusculis minutissime granuloso-papillosis obscure minute areolatis, basi subpellucida, margine plana integerrima tenui, apice extremo subpellucido nonnullo minute serrato, costa basi lata deplanata tenuissima supra medium vix a lamina distinguenda longe ante apicem evanida: cætera desunt.

Yosemite Valley. Communicated by *Mr. James*.

This species is well distinguished from all others of the genus known to me by its long linear convolute leaves plane on the margin and incurved towards the apex, and with a remarkably thin costa which is not at all prominent on the back. The cells at the base of the leaf are very small narrow and pellucid, soon passing into quadrate, and then into granular above.

SOME NOTES ON VARIATIONS.—*Liatris scariosa*, *L.*, found in 1873–4 around Grand Rapids, Mich., frequently had as many as 80 heads on a spike, heads often as many as 60-flowered. *Liatris squarrosa*, *Willd.*, often had the remarkable number of from 70 to 92 florets in a head. *L. squarrosa*, *L. cylindrica*, *L. scariosa*, and *L. pycnostachya*, almost always presented the characters of pubescent achenia, and punctate leaves and scales. But the most remarkable *Liatris* was one that seemed to be intermediate between *L. scariosa*, and *L. squarrosa*, found south of the city along side of the Grand River Valley R. R. Heads of flowers usually large, and the upper ones—very seldom the lower—had colored scales, much longer than the florets, intermixed with them. Sometimes there would be twelve or fifteen of these scales; often not more than five or six. Otherwise the receptacle was smooth. Have never seen this feature in any other locality, nor heard of it anywhere.

Another singular variation noticed was in the *Ranunculus multifidus*, Pursh[*R. Purshii*, Rich.]. It very often occurred, in the numerous ponds around Grand Rapids, with double and quilled flowers and often with the scales changed to tubular appendages, with an entire, or lacerate border. The flowers were very large for the species, and the leaves sometimes very much dissected, sometimes with but few divisions. On one occasion I came upon a patch—or field—of some two acres nearly covered with the bright golden flowers. I could see them for a long distance before I reached them, and when I reached the border of what I afterwards found was a drained pond I was much surprised as well as interested to find all the plants growing in the moist soil with leaves not more divided than in *R. bulbosus*, and stems from five to ten or twelve inches high, and both leaves and stems pubescent. There were two or three low places

where water was still standing, and in these the lower leaves presented the usual dissected appearance.

I also found *Flærkia proserpinacoides*, Willd., growing in moist soil, at some distance from any water. Apparently the ground was kept moist by the thick trees.

During the autum of '73 I frequently found *Viola Canadensis*, L., and *V. rostrata*, Pursh., with apetalous flowers and large full capsules, and occasionally *V. Muhlenbergii*, Torr., presented this feature. I do not refer to subterranean apetalous flowers, but those growing upon the stems. Many species have the subterranean capsules. Since I came to Connecticut I have found *Viola sagittata*, Ait., and *V. lanceolata*, L., with the character described above, that is with apetalous flowers, both subterranean and on scapes.

Found one *Trillium grandiflorum*, Salisb., with four leaves, four petals, four sepals, four stamens, two stigmas, ovary four angled and one edge each of two opposite petals curled as if they had partially absorbed the two missing stamens. Once I found a *Trillium erythrocarpum*, var. *Cleveландicum*, Wood., with six sepals and fifteen petals *all* green.

Oct., 25, 1873, I found a *Salix* in fruit, which was well ripened, and some of it falling from the scales. The leaves were mostly fallen, and what remained were so blackened by the frost that the species could not be determined with certainty. They resembled those of *S. lucida*. The question in regard to it was, is this the second fruiting of the season?

In the spring of '73 I found a field of more than two acres covered with the flower of *Valeriana sylvatica*, L. The next spring scarce a blossom could be found in this field, and this was the only field then seen that produced them. A few were afterwards found in another field. What caused their disappearance? Near by was an abundance of *Cypripedium spectabile*, Swartz., and the finest specimens I ever saw. The next year not a flower could be found in the locality, and only one plant, a half starved specimen with two leaves. Why this change? I think that if a reason could be found for these disappearances, it would throw light on the question of veracity which has arisen in regard to the statements of some writers, who having said they had found certain flowers in a certain location, have been judged to be mistaken, because others could never find those flowers in the same localities.

The *Arctostaphylos Uva-ursi*, Spreng., sometimes occurs in Michigan with leaves ciliate on the margin, petioles pubescent, stamens pubescent, and young branches quite so.—N. Coleman, *Bloomfield, Conn.*

Foreign Plants in Northern California.—At the time of the publication of the Bot. Cal., Vol. I, last spring, *Verbascum Thapsus*, L., was "yet unknown on the Pacific coast." But I find it well established and apparently spreading too rapidly at several localities in the interior of the extreme northern portion of the State.

In an old field near Yreka, Siskiyou county, there grows a great quantity of another foreigner, and one which has not often been recorded as established, or even adventive in North America, namely, *Lepidium Draba*, L., of Europe. *Datura Tatula*, L., is here first recorded from California. It occurs plentifully by the roadside, at Callahan's Ranch, Siskiyou county.—Edward L. Greene, *Yreka, Cal.*

Root-Leaves of Alisma Plantago, var. Americanum, Gray.—While on a botanizing tour near New Harmony, Ind., last May, I came to a small pond in which the water was gradually drying up. On approaching the border I found what was then a plant from 2–4 inches high, which was just beginning to bud, and in some plants flowers were partially opened. A more thorough examination proved that these plants were not found within 4–5 ft. of the water's edge, but from this on to several feet. Under the water, the muddy surface was covered by tufts of a grassy looking plant, the thin membranous leaves (*phyllodia ?*) of which were linear-lanceolate, from 2-5 inches long, from $\frac{1}{8}$–$\frac{1}{4}$ inch broad. Turning my attention now to the plants first found I discov-

ered they had sprung from the same tufts of roots as those last observed, and then found them in all stages of transition; the root-leaves drying up and disappearing as the mud dried up, leaving only the plants first noticed; which were subsequently found to be our common *Water Plantain*.—J. Schneck, *Mt. Carmel, Ill.*

Recent Publications.—*American Journal of Science and Arts*, January. An address delivered at South Kensington by Dr. J. H. Gilbert "On some Points in Connection with Vegetation" is begun in this number. Dr. Gilbert confines his attention almost exclusively to the "Sources of the nitrogen of vegetation in general, and of agricultural production in particular." Dr. Gray gives a short review of a paper read upon the "Geographical Statistics of European Flora," which is so condensed and interesting, that, but for the lack of space, we would reprint it.

The American Naturalist, February. The botanical papers of this number are numerous and full of interest. Owing to the exceedingly crowded condition of our pages, we are compelled to simply mention articles that are worthy a more lengthy notice. The botanical articles are a very readable paper upon "The Distribution of Plants in New Hampshire and Vermont," by William F. Flint; Fertilization of *Gentiana Andrewsii*," by Dr. Gray; "Origin of Varieties; Two Illustrations," by J. J. H. Gregory, and "*Ipomœa setosa*," by Mary Treat.

Field and Forest, January. Mr. Rudolph Oldberg gives a list of the Mosses and Hepaticæ of the District of Columbia.

Proceedings of the Academy of Natural Sciences of Philadelphia, Parts I. and II., 1876. Quite a number of botanical papers are contained in these parts, and that indefatigable observer, Mr. Meehan, is largely represented.

Report of the Botanist: [Charles H. Peck.] *Made to the Regents of the University of the State of New York*, from the twenty-eighth annual report. This is a pamphlet of about 60 pages, containing two handsome plates of new Fungi. Mr. Peck is making annually very large contributions to our species of Fungi, and this report contains no less than 70 species new to science and 150 new to the herbarium. Lists are given of the plants mounted and contributed, together with the names of the donors. If other states would only imitate New York in this respect, herbara would be secured them that would soon make State Floras something more tangible than at present, and would at the same time greatly advance the interests of botanical science at large.

Forest Culture and Eucalyptus Trees, by Ellwood Cooper. This is a little book of over 200 pages, being mainly a printed copy of a lecture on "Forest Culture and Australian Gum-trees" by Mr. Ellwood Cooper, President of Santa Barbara College, California, and descriptions of Eucalyptus trees from the pamphlets of Baron Ferd. Von Mueller.

Note.—*Calochortus Kennedyi*, n sp., of the February number of the Gazette, has been, as I have since learned, distributed in sets of California plants, collected in May, 1876, by Dr. Palmer, under the unpublished name of *C. Wallacei*.—*Gilia Kennedyi*, n. sp., of the same date, is *Gilia Parryæ*, Gray, in Contr. Proc. Am. Acad., issued Dec., 27, 1876. The publication did not reach me until the end of January, when it was too late to withdraw my name.—T. C. P.

All communications should be addressed to

John M. Coulter, Hanover, Ind.

M. S. Coulter, Logansport, Ind.

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NOTES ON THE ARBOREOUS, ARBORESCENT AND SUFFRUTICOSE FLORA OF OREGON (concluded).—*Fraxinus Oregana*, Nutt. Along streams and lowlands, attains 3 feet in diameter, generally smaller, low and scrubby, very little clear lumber to be had from the best trunks. It is used chiefly for fuel and is estimated for this purpose to be nearly double the value of either of the species of *Abies*, and brings about twice as much per cord in the market. As fuel its value is about equal to that of the oak, and very large quantities are now used in the country and the supply must soon become exhausted near the cities.

Celtis reticulata, Torr. A shrub of straggling growth, 6 feet high at the Dalles of the Columbia, fruiting abundantly, fruit dark brown when ripe.

Quercus Douglasii. Hook. This is the only species observed on the Williamette or Columbia rivers. It disappears near the coast and does not reach far into the Cascades. It seems confined to the hilly regions of valleys and attains 2 and 3 feet in diameter, rarely 4 feet, but is low and scrubby. Some trees will afford a 12 foot stick comparatively free from knots. The branches are wide spreading and drooping, often coming so near the ground that they can be reached with the hand. *Phoradendron flavescens*, var. *pubescens* grows upon this tree exclusively and is not rare on the lower drooping limbs. It is the hard-wood tree of the carriage maker and is extensively used in the manufacture of heavy wagons, but all light carriage material is brought from the Eastern States.

Castanopsis chrysophylla, A. DC. A branching shrub, 4 feet high in the Cascade mountains, with fruit resembling the chestnut.

Corylus rostrata, Ait., var. *Californica*, A. DC. The shrub of the usual size has rounder, not pointed leaves and the beak of the fruit quite short, the upper as well as the lower surface of the leaves pubescent, serratures much finer. Along streams, rather rare.

Myrica Californica, Cham. & Schlecht. Sandy hills on the coast. A shrub 4 to 10 feet high with lanceolate, toothed leaves.

Betula pumila, L. A shrub 3 to 4 feet high, in ponds.

Alnus Oregana, Nutt. (*A. rubra*, Bongard). A medium sized tree on stream banks in the valleys, the largest attaining 3 feet in diameter and 40 to 60 feet in height. Mostly scrubby and very little clear lumber can be made from the best trunks.

Salix longifolia, Muhl. On the Williamette River, 6 to 8 feet high.

Salix lanceolata, Anderson. A tree a foot in diameter, 30 feet high, with lanceolate, long pointed, smooth, finely serrated leaves, on banks of streams.

Salix chrysophylla, var. *pellita*, Anderson. Wet Alpine woods in the Cascades. A low shrub.

Salix Sitchensis, Bongard. A large shrub with silvery silky leaves, very pretty.

Salix sessilifolia, var. *villosa*, Nutt. A shrub on the Williamette River, 4 to 6 feet high, with whitish villous leaves.

Some other undetermined species occur.

Populus balsamifera, L. This is the common poplar of this State, attaining 4 feet in diameter, generally 2 to 3. It grows frequently symmetrical and rather tall and often affords logs for clear lumber. It abounds on the streams and lowlands in the valleys, and though common it is not abundant. It is used to some extent for lumber.

The leaves are rather lanceolate and not cordate, approximating or passing into *P. angustifolia*, Torr.

Populus tremuloides, Michx. A much rarer tree, abounding only in certain low wet localities. In size and habitat it is very much as it is found in the Eastern States.

Pinus ponderosa, Dougl. The true Douglasian form occurs mostly as a low scrubby tree on the dry slopes of the Cascades and bluffs of the Columbia River. It is used to some extent in the manufacture of lumber and for fuel.

Pinus contorta, Dougl. Two forms of the species occur in the Cascade mountains, mostly as mere shrubs, but sometimes attaining 30 feet in height and 4 to 6 inches in diameter.

Pinus albicaulis, Eng. On Mt. Hood at the limit of tree growth where it shelters in ravines and on the eastern sides of large rocks from the fierce western gales that prevail on that famous, perpetually snow-capped mountain. Some interesting effects of the influence of strong constant air currents upon tree growth are exhibited here not only in the leaning trunks, but in the decumbent and elongating mode of development seen in this species. Finding a resting place on the east side of some huge rock it grows erect until the top reaches the summit, from which the limbs elongate and spread eastward to a surprising length. The uppermost branches are often dead and bleached to a snowy whiteness. The species as developed here, was in staminate flower the first of August, no cones were seen. It grows 6 inches in diameter, low and straggling.

Pinus monticola, Dougl. A small tree resembling the white pine of the eastern states, grows along streams in the high Cascades, a foot in diameter and 40 to 50 feet high. The cones are large, 6 to 10 inches long, with rounded obtuse scales.

Abies Mertensiana, Lindl. This tree much resembles *A. Canadensis* of the eastern states. It occupies vast areas in the middle Cascades, but reaches the valleys sparingly. Some of the densest forests of the country are composed exclusively of this species, often growing so thickly as to shut out the light of the sun. Altitude changes the appearance of this species as it also does in some others. The valley specimens have a rather smooth bark, whilst the mountain forms have a rough furrowed bark. The trees average about 2 feet in diameter and reach the height of 200 feet in the Cascades, but they are little used at present, being mostly inaccessible in the mountains.

Abies Pattoniana, Jeffrey. (*A. Williamsoni*, Newberry.) This is a small species in the Alpine regions of the Cascades. It grows 6 inches to 2 feet in diameter and 40 to 60 feet high. It reaches, along with *Pinus albicaulis*, to the limit of trees on Mt. Hood. The gloom of these Alpine woods is made more dreary by the vast abundance of the dark gray lichen *Alectoria Fremontii*, Tuck., hanging in dense festoons from all the branches of this tree, evidently dwarfing it in its growth both in diameter and altitude, as it is said to grow much larger and taller at lower elevations.

Abies Douglasii, Lindl. This stands at the head of the forest trees of Oregon both in regard to size and stateliness and in its value to the industries of the country. It attains 6 and 8 feet in diameter, and, rarely, 300 feet in height, generally 200 to 250 feet and 2 to 4 feet in diameter. It is extensively manufactured into lumber for all building purposes. It affords probably 50 per cent. of all the fuel used by the inhabitants in the valley regions. The bark is thick and rough. It bears fruit abundantly.

Abies grandis, Lindl. This is the next most valuable timber tree. Attains equal height to *A. Douglasii*, but is much less in diameter (2 to 3½ feet). The bark is smooth, with blisters containing resin, which makes the handling of the wood very annoying, as the hands and clothing become coated with it. It is used for lumber and for fuel. The branches are short and symmetrically arranged, the whole tree forming a beautiful cone. The leaves are dark green, resembling *A. balsamea* of the eastern states. The cones are produced very sparingly on the topmost branches, the scales deciduous

Abies subalpina, Eng. This is a small tree in the Alpine regions confounded till recently with *A. grandis*. It is a beautiful symmetrical tree 30 to 60 feet high.

Abies Englemanni, Parry. In the higher Alpine regions, about Alpine prairies, etc. A stately tree of small diameter, growing so densely in its peculiar habitats, that no trunk can fall to the ground alone. Circular areas of an acre or two are frequently seen in the Alpine heights where the entire growth has been prostrated and lies a labyrinth of trunks that have apparently fallen in every direction, evidently caused by the action of a circular wind, no effects of which are to be seen outside of the prostrated areas. This tree in fruit, etc., much resembles *A. Menziesii* of the coast region, and is probably no more than a high mountain form of it.

Abies Menziesii, Dougl. This tree abounds in the coast regions to a limited extent where it fruits abundantly. It is not known to be of much importance to the country.

Taxus brevifolia, Nutt. Grows nearly or quite upright and attains a diameter of a foot or over, but is low and scraggy, with spreading, drooping limbs. The foliage is bright green and ornamental. It is used for fence posts chiefly on account of its durability, but it is scarce and of no great value to the country on that account. The berries are red and edible when ripe in September.

Juniperus communis, L., var. *alpinus*, Parl. This is a trailing form of the species, never rising from the ground but trailing and rooting from its limbs, forming large clumps 10 to 20 feet in diameter. Occurs at the limit of trees on Mt. Hood.

Cupressus Nutkanus, Hook. A low branching shrub in the Alpine regions of Mt. Hood. Identification doubtful.

Thuja gigantea, Nutt. Called cedar by the inhabitants. Is a tree of average size and height, 1 to 4 feet, generally 2 to 3 feet in diameter and 60 to 150 feet high. Inhabits the mountain ranges, reaching the Williamette valley at some localities. It is much used for shingles and split boards, being remarkable for straightness of grain and facility of splitting, often to very long lengths of even proportions. It is a valuable tree, but now nearly all the region where it plentifully abounds has been run over by the fires and it only exists as dead, blackened stumps, standing or prostrate, soon to be lost to the country. This destruction of forests in Oregon by fire seems to have been recent. The huge standing or prostrate dead trunks, now almost universal in the Coast range and over large areas of the Cascades, testify to the millions the country has lost by this destructive element.—Elihu Hall, Athens, Ill.

Bryological Notes; by C. F. Austin.—Didymodon Wollei (*Barbula? Wollei*, Aust., Bot. Gazette, March, 1877).—Plantæ dense cæspitosæ, fragiles saturate virides; caule erecto subsimplici, foliis siccitate subcrispatis madefactis subcirrhatis subcanaliculatis vel apice excepto planiusculis paulo undulatis margine planis minute papilloso-crenulatis apice pugioni formi-acutatis, costa percurrente, vel brevissime excurrente haud lutescente; flores et fructu ignoti.

Rocks in a ravine, near Bethlehem, Pa., *Rev. F. Wolle*.

Somewhat intermediate between *Barbula cæspitosa* and *Didymodon cylindricus*. From the former it differs in its longer stems, rather broader less carinate less undulate and more fragile leaves, not uniformly recurved-patent when moist, less pellucid at the base, and with the costa neither pellucid when moist nor shining on the back when dry. Very near the latter, but differing in its more robust habit, shorter and broader leaves rather less pellucid at the base and more or less contracted at the apex into a dagger-shaped canaliculate point.

Atrichum Selwyni, *n. sp.*—*Ab A. angustato* proximo differt; foliis latioribus subspathulatis plerumque obtusis basi excavatis, costæ lamellis solum 4–6 altioribus, *calyptra lævissima*.

North West Coast of British America, 1875, *Macoun*.

Stems about ½ inch high. Leaves lanceolate-oblong, subspatulate, mostly obtuse, the base excavated, the lamellæ of the costa 4–6, broad; otherwise they are about as in *A. angustatum*. Inflorescence dioecious; male plant not seen. *Calyptra perfectly naked*

The capsule is rather shorter than usual in *A. angustatum*, otherwise it is much the same.

Bartramia Macouni, *n. sp.*—Plantæ subrobustæ (magnitudine *B. pomiformis*), cæspites sat densos molles pallide cineraceo-virides formatæ; caule unciali et longiore flexuoso-erecto fasciculatim ramoso inferne parceradiculoso; foliis mollibus in siccis laxe subcirrhato-crispatis in humore strictiusculis erecto-patentibus undique vergentibus longe lineali-lanceolatis leviter carinatis facie superiori indistincte papillosis, margine leniter incrassato inferne subrecurvo planove superne argute serrato, costa longe excurrente dorso apicem versus subserrata, reti perminuto quadrato-rotundo, basilari paululum latiori lineari ferrugineo, perichætialibus 2–3 multum minoribus angustioribus erectis; capsula in pedicello 6–8 lineas longo exserta globosa siccitate subhorizontali et leviter striata, parietina mollissima e cellulis oblatis rotundisve inflatis pellucidis formata, annulo nullo, operculo depresso-conico obtusissime mammillato; peristomii dentibus sat rubris solidis latis tæniato-subulatis integris lævissimis crebre (circiter 25) articulatis humiditate in conum conniventibus, ciliis paululum latioribus brevioribus luteis subdicranis lævibus subnodulosis, ciliolis longioribus et brevioribus solidioribus angustissimis rufescentibus; sporangio libero: florescentia synoica; flore adspectu laterali perminuto, organis genitalium utriusque sexus paucis, paraphysibus paucissimis.

Vancouver's Island, May, 1875, *Macoun*.

Near *B. Œderi* (Gunn.) Swartz in general appearance, but it is really a very distinct species, as a comparison of the above description with the following notes will show:—*B. Œderi*, is somewhat smaller in size and usually of a ferrugineous or fuscous green color. The stems are very radiculose below; leaves more distant, much shorter, more rigid, strongly recurved whenmoist, more carinate, very stronglyrevolute on the margin, still less distinctly papillose above, the cells mostly paralellogramoid; capsule dark colored and strongly ribbed when dry, of a much more solid and opake texture, the cells oval and somewhat larger; peristomal teeth a little less solid, not so closely articulated, more suddenly narrowed above the base, not so even on the margin, less fragile, the ciliæ rather more perfect; sporangium not free; flower larger; perichætial leaves like the stem-leaves; paraphyses many times more numerous and very conspicuous.

Dicranum Macouni, *n. sp.*—Plantæ sat dense cæspitosæ, pallidæ, stramineo-virides vel subalbescentes; caule strictiusculo erecto subsimplici fere ad apicem breviter rufotomentoso, foliis subsecundis a basi anguste lanceolata sensim longe subulato-acuminatis semiconvoluto-concavis leniter falcatis lævissimis integerrimis vel apice extremo obsolete serratis, costa tenui sub apice finienti, reti minutissimo cellulis a basi usque ultra medium angustissimis linearibus, illis versus apicem multum brevioribus duplo latioribus subovalibus discretis, illis inflatis ad angulos paucis luteis spatii inter marginem et costam vix ultra dimidium occupantibus: sterile.

Peace River, 1871, *Macoun*.

Readily distinguished from all its congeners by its smooth and entire leaves, with a very light costa and with long and extremely narrow cells.—About the size of *D. albicans* and *D. Sauteri*.—The leaf-cells are much narrower than in any other species known to me.

Dicranella Canadensis (Mitt.) *Cynodontium Canadensis*, Mitt. *in the Jour of the Linn. Soc.* 8, *p.* 17.—Size of the plant, capsule, peristome, etc., precisely as in *D. varia* (which probably accounts for its being generally overlooked) The shape and position of the leaves however are quite different—more as in *D. squarrosa*. However, in texture they are nearer to the former species. In D. Canadensis the perichætial leaves are like the stem-leaves in size, position, etc., (semivaginal at the base and recurved-spreading); in *D. varia*, on the contrary, they are diminished in size, erect, not vaginal,

at the base; furthermore the leaves of the latter are every way like those of *Leptotrichum tortile*. Mr. Macoun has found both *D. Canadensis* and *D. varia* on Vancouver's Island. Of the latter species he has sent me a fine specimen; but of the former only a small fragment, which appears to have got accidentally mixed with *Barbula unguiculata*. It is probable that this moss is not rare in the North West.

FISSIDENS HALLII, *n. sp.*—Statura facieque *F. incurvis*, statim dignoscitur tamen foliis margine crenulatis haud limbatis, operculo longius rostrato (semper?) calyptra vix ad basim rostri producta basi haud fissa etc.—Capsula erecta, pedicello mediocriter longo, florescentia dioica, plantæ utriusque sexus immixtæ.

Texas, *Hall*.

FISSIDENS INCURVUS (W. & M.) SCHWGR, var. LONGIPES.—Differt a forma normali pedicello ratione cauli longiore, antheridiis 1–3 nudis in foliorum axilis eparaphysatis, etiam in codemque caule cum pistillidiis paraphysatis apicali.

On the ground, Vancouver's Island, 1875, *Macoun*.

FISSIDENS INCURVUS var. MONOICUS. (*F. monoicus*, AUST. *in litt. ad* SULLIV., 1869.) Habitu, foliatione, etc., normali sed florescentia *F. bryoidis*.

On a moist red shale bank of the Black River, at Vleet-Town, Hunterdon county, New Jersey, August, 1877. (Matures in July and August.)

The var. SYNOICUS (*F. synoicus* Sulliv.) matures its fruit late in autumn. It grows on limestone banks and rocks along streams. (Haverstraw, Albany, Watkin's Glen, &c., in New York, also Canada and Ohio.)

The var. MINUTULUS (*F. minutulus* and *F. exiguus*,) SULLIV. matures in summer. It occurs only on stones in damp places, shaded ravines, about springs, etc. (*F. Closteri*, AUST. may be looked for wherever this var. occurs; it matures in August.)

The var. CRASSIPES (*F. crassipes* WILS.) is found in somewhat similar situations as the preceding var.; but along larger and less limpid streams, and where it is subject to inundation, often for several weeks at a time.

The more normal forms, of this, in some respects, extremely variable species, do not appear to occur east of the Rocky Mountains, except in the Southern and Southwestern States.

F. DECIPIENS DENOT. SULLIV. *Icon. Suppl.* (*F. rupestris* WILS.) Occurs on shaded rocks in mountainous localities, throughout the Middle and Eastern States. I first separated this species from *F. adiantoides*, its nearest ally, by its subterminal fruit and minute leaf-cells, ten years ago, and had kept it under Wilson's name.

It occurs abundantly on trunks of trees in Florida.

F. TAXIFOLIUS HEDW. is common on moist shady banks (never truly on rocks) in the Middle States. Like the preceding species (also *F. adiantoides* and *F. osmundioides*) it matures its fruit late in autumn.

ENCALYPTA MACOUNI, *n. sp.*—Ab *E. affinis* HEDW. *f.* (*E. apophysata* N. H. S.) proxima recedit follis muticis, costa sub apice finiente, capsula (valde immatura) magis-apophysata (sinistram versus leniter torta?) peristomii dentibus brevioribus dimido-angustioribus, calyptra basi elegantissime fimbria, persistente, et al

Stewart's Lake Mountains, June, 1875, *Macoun*.

Calyptra about as large as in the largest examples of *E. ciliata*, light fuscous yellow, (the fringe brown, uniform, narrow and delicate) densely papillose over the whole surface. Pedicel reddish, minutely papillose, rather densely so above the middle, more remotely so below it, slightly twisted to the right in drying. Apophysis at the base of the capsule very large. Peristome single, the teeth of medium length, very narrow and filiform, red, more or less split into two equal segments nodulose and granulose Leaves much crisped when dry, straight and erect when moist, narrowly ligulate, carinate, broadly revolute on the margin, mutic, very opake; the costa ceasing below the apex and densely papillose on the back Perichætial leaves much smaller and thinner,

the innermost scarcely exceeding the vaginula, with a broad subvaginal base and a lingulate, very obtuse apex Inflorescence monœcious, male flower on a short stalk.

A Moss New to the United States.—*Pilotrichum undulatum*, Beauv., a West Indian moss, occurs, in a small collection of plants made recently near Fort Reid, on the upper St. Johns, Florida, by Miss E. S. Boyd. The specimens, though scanty, are in fruit. The moss has a general resemblance to small specimens of *Nectera penata*, but the leaves are very inequilateral, and strongly nerved more than half way; and the perichætial leaves, are peculiar, the lower ones ovate-acuminate with squarrose tips, and the upper ones narrowly linear, very slender, and overtopping the capsule. With it were also *Pilotrichum cymtifolium*, Sull., *Leucobryum minus*, *Thuidium tamariscinum*, a large sterile *Fissidens*, and the red Louisiana lichen, *Chiodecton rubro-cinctus*, Nylander.—Daniel C. Eaton, New Haven, March 29, 1877.

Botanical Contributions by Asa Gray, *Proc. Amer. Acad.*, *Vol.* 12. *December*, 1876.—This contribution to North American Botany is one full of interest. The list of new species is large and principally western, though there is quite a representation from the south. The pamphlet also contains two fine plates, one of *Arctomecon Californicum*, Torr., and the other of a new genus and species *Canbya candida*, Parry. Then follows a description of the new genus dedicated by Dr. Parry to Mr. Wm. M. Canby and a reconstruction of the very rare genus *Arctomecon*, Torr. These genera belong to the order *Papaveraceæ* and are both very peculiar in the persistency of the corolla. The new genus was discovered in S. E. California by a botanical party, consisting of Doctors Palmer and Parry and Mr. Lemmon, May 18, 1876. The new species are supplied by various parties, Rev. E. L. Greene, T. S. Brandegee, Dr. Parry, Dr. Rothrock, and Powell's Expedition of 1875, being the principal contributors. Of course the numbers of the *Astragali* are increased in this case by an addition of seven species and two varieties. The proportions this genus is beginning to assume as our western territory is becoming more thoroughly explored is something startling. A new *Lespedeza* is described, having been found in Minnesota, Illinois and Iowa.

The relations of *Clethra* and *Pyrola* are considered and rather than break up the original *Ericaceæ* into seperate orders, as has been done by DeCandolle and other European botanists, Dr. Gray combines *Clethra* and the tribe *Pyroleæ* into the third sub-order, *Pyrolineæ*. The section *Steironema*, Raf. of *Lysimachia* is restored to generic rank and hence the species of N. United States are as follows:

Steironema ciliatum, Gr.=*Lysimachia ciliata*, L.

S. radicans Gr.=*L. radicans*, Hook.

S. lanceolatum, Gr.=*L. lanceolata*, Walt.

S. longifolium, Gr.=*L. longifolia*, Pursh.

The genus *Asclepias* and its allies are rearranged in the following genera; *Podostigma*, Ell., *Anantherix*, Nutt.(§ 2 of *Acerates* in Gray's Man., 5th Ed.), *Asclepiodora*, Gr. (containing *Acerates paniculata*, Decaisne.), *Asclepias*, L., *Acerates*, Ell., *Schizonotus*, Gr. (containing *Gomphocarpus purpurascens*, Gray, Bot. Calif.), and *Gomphocarpus*, R. Br. A key is also given to the North American species of the genus *Asclepias*. Dr. Gray also gives a conspectus of the confused and difficult genus *Gonolobus*, Michx., with the sections *Dictyolobus*, *Eugonolobus* and *Chthamalia*, the last being reduced from generic rank.—J. M. C.

On Excrescences and Excentric Wood Growths in the Trunks of Trees.—This is the subject of a communication of Mr. Thomas Meehan to the Academy of Natural Sciences of Philadelphia, December 19, 1876, and appears in the Proceedings, Part III, of that year. The strange excrescences found in so many of our trees have often been the causes of no small curiosity in regard to the cause of their formation. Till very lately these monstrous growths have been referred to insects as their origin. Mr. Meehan calls attention to the fact that these excrescences were often of a uniform

character in each species of tree. They are not merely abnormal developments of the bark, but are composed of true woody fibre disposed in annual rings and surrounded by bark, as though they were so many separate centers of growth. Mr. Meehan suggests the following explanation of these excrescences. By experiment it is shown that there is no difference in the first place in any part of the cambium layer or layer of growth, although subsequently the inner part produces wood cells. "The same cell may become permanent tissue or generating tissue, and from the generative tissue may come before the season of growth closes every form of structure known to anatomists, from pure wood to the outermost cuticle of the bark. We know that cell-growth is not always uniform in its operations. The law that changes the outermost series of newly cells into liber need not necessarily operate so exactly as to make them perfect to this end—a few may be thrown off into the liber as generative tissue—and, granting this possibility, we see how the woody granules in the apple bark are formed." In this same way, Mr. Meehan infers, the larger excrescences with rings of growth are formed. In this case "the imperfectly formed liber cells, still retaining their generative power, make a growth the next season, forming a layer of wood and making its own cortical layer, simultaneous with the normal wood growth of the tree, assimilating from the same store of reserve material that the normal growth does."—J. M. C.

Wolffia.—*Wolffia* in Gray's Manual, page 480 (Ed. of 1869), is described as having "*fronds rootless*, proliferous from a cleft or funnel-shaped opening at the base, the offspring soon detached." Last summer I watched *Wolffia* pretty closely and with much interest. In plants from my locality the manner of its reproduction seems to be this. I noticed plants that were nearly spheres, others that were oblong, or prolate spheroids, and of these some had indentations about the middle, which varied in depth, until in some of the plants the two portions were merely in contact and these soon went apart, making two perfect plants.—Dr. H. C. Beardslee, *Painesville, Ohio.*

Prof. Theo. B. Comstock, of Cornell University, proposes to conduct an "Aquatic Summer School of Natural History." A steamer is to be chartered for four or six weeks to cruise along the "south and west shores of Lakes Erie, Huron and Superior, thence along the north and east shores of the same waters." The route is certainly a tempting one to botanists and the fee, $125 including everything for 30 days, is so moderate that we have no doubt many will be temqted to make application to join the expedition.

We take pleasure in calling attention to a circular issued by H. Eggert of St. Louis, Mo. It surely presents a rare chance to botanists to obtain sets of the fine and many rare plants found in the neighborhood of St. Louis. We have received a set of Mr. Eggerts' plants and have found them to be exceedingly fine specimens and can cordially recommend them to our friends. Mr. Eggert offers for sale or exchange a selection from a list of about 500 species collected in the vicinity of St. Louis. He allows those who wish to buy, the privilege of chosing from the list such plants as they desire to obtain, at the rate of 6 cents per species for full and complete specimens. Dr. George Engelmann is given as reference. The list may be procured by addressing H. Eggert, 918 Wash St., St. Louis, Mo.

In a note from Prof. M. W. Harrington, written from Leipzig, Germany, the following is of general interest. "The great German botanist, Prof. Hofmeister, died a few days ago. The two parts of his *Handbuch der Physiologischen Botanik*, promised for 1876, were not prepared and the book must therefore remain unfinished. To those who have possessed the earlier parts—some already 10 years old—this must be a source of great regret.

Albinism in Plants.—In the Oct. No. of the Bulletin I see a notice of a white *Lobelia syphilitica*, L. In confirmation of this fact, I will state that I have found two

similar specimens, one in 1873 and another this fall. The one found this season was almost pure white, and was found in a large group of its kindred, which were all of their natural color. My specimens were both in full bloom when found.

I have also found, every spring for the last seven years, some specimens of white, or whitish plants of *Eupatorium serotinum*, Michx., but these have invariably resumed their natural green color by flowering time. This peculiarity was not confined to specimens that grew in deep shades, but was observed as well in examples that grew exposed to bright sunlight.—J. SCHNECK.

CAMPTOSORUS RHIZOPHYLLUS.—In a note from Miss H. J. Biddlecome, of Springfield Ohio, the following is of general interest—"In No. 6, Vol. I, a writer, referring to variations of the basal lobes of *Camptosorus rhizophyllus*, mentions having a specimen in which one of the lobes is prolonged out from the rhachis from an inch to an inch and a half. I have three times found specimens having the lobe extended on one side five inches, in two of them the apex had taken root, but had not yet given rise to a plant."—J. M. C.

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, February. Dr. Gray gives a very interesting review of Charles Darwin's new book on "The Effects of Cross- and Self-Fertilization in the Vegetable Kingdom," The book is principally devoted to the details of experiments going to prove that cross-fertilization is beneficial to the plant. Dr. Gray says that the book is not light reading, but if it is as interesting as his view, it is well worth a careful persual.

The Gardener's Monthly, February. Mr. Meehan thinks that the extreme views of so many botanists in respect to the necessity of cross-fertilization are weakening. According to Dr. Gray, nature's golden rule for flowers is, "Get fertilized, cross-fertilized if you can, close-fertilized if you must." W. M. Canby gives a short, but interesting note upon the singular anology in *Darlingtonia* and *Sarracenia*.

Bulletin of the Torrey Botanical Club, January. The second article on "Libraries and Herbaria" gives an account of the New York State Herbarium located at Albany. "It is intended to represent and illustrate the Flora of the State and comprises about 1600 species of Phænogans and 2500 of Cryptogams.

Report of the Botanist, made to the Regents of the University of the State of New York. This report, from the twenty-seventh annual Report on the New York State Museum of Natural History, was received after the twenty-eighth, which was noted in the last number of the GAZETTE. Mr. Peck seems to be diligently engaged, not only in describing new fungi, but in mounting and arranging botanical specimens of all kinds. The report contains descriptions of 39 species of fungi new to science. It is also valuable to all who are desirous of working up the fungi of their region, for it contains full direction for their collection and preservation.

A Grand International Exposition of Horticulture and the Products of the Vegetable Kingdom is to be held in Amsterdam from April 13 to May 2, and in connection with it a congress of Horticulturists and Botanists, by whom many important questions will be discussed on the theory of Botany, the Practice of Horticulture, and the cultivation of the most important vegetable products, such as cotton, tobacco, quinine, indigo, etc. The prizes will consist of medals of gold, silver, and bronze and certificates, to be awarded by a jury of Dutch and foreign scientific gentlemen. We do not know whether any preparations have been made in this country for contributing to the Exhibition, but it is to be feared that the notices have been sent too late to enable advantage to be taken of them here.—W.

Address: John M. Coulter, Hanover, Ind.
M. S. Coulter, Logansport, Ind.
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THE USE OF CARBON BISULPHIDE IN THE PRESERVATION OF PLANTS.—A correspondent sends us the following translation of the essential part of M. R. Lenormand's "Notes on the use of carbon bisulphide for the preservation of Herbaria," extracted from the *Bulletin de la Societe Botanique de France*.—[ED.]

"During a visit made me by my friend M. Doyere, he desired to see if I possessed an *Arum* which he had observed in the vicinity of Algiers without having had time to study it. In running through the fasiculus of my herbarium which contained the family of Aroides we too often had occasion to notice the ravages that had been made by insects principally in the tuberous roots of these plants. The idea immediately came to M. Doyere to rid me of this by means of carbon bisulphide of which he had made use with such wonderful results in the preservation of the cereals. * * * It is in the behalf of naturalists who too often notwithstanding the precautions they have taken, are grieved to see their collections deteriorate and go to ruin from the incessant attacks of these inveterate enemies, that I hasten to give it all publicity possible.

* * I have acted only under his (M. Doyere's) direction and counsel. The apparatus which I use was made from his designs. The quantity of carbon bisulphide, the time necessary for each test were all calculated by him. It is not then astonishing that I have always had the most complete success. * * I had made a box of white wood 1 meter and 50 centimeters long by 80 centimeters high and 50 centimeters wide, lined entirely inside with thin sheets of zinc well soldered together to prevent as much as possible all escape of vapor. The movable lid fitted on the sides of the box, so as to form a projection all around. The interior is divided width-wise into two apartments of which the one intended for the carbon bisulphide is but 1 decimeter broad—the partition is formed of thin wood, and stops at 6 centimeters from the bottom of the box and rises to within 8 centimeters of the top. The large apartment can hold ten or twelve fasiculi of my herbarium placed in two layers one above the other, the first or lower supported by two fixed bars at 6 centimeters from the bottom, or the height of the base of the partition.

"Two other *movable* bars (in order to render more easy the placing of fasiculi) support the second row of fasiculi, between which and the first there is a free space of 6 centimeters, between this second and the top of the box there is a space of 8 centimeters. Before placing the fasiculi in the box I loosen the cords which fasten them so that the sheets of paper will not rest crowded upon each other and in that way prevent the vapor from easily penetrating between them. The smaller apartment is loosely filled with shavings, I empty upon them one decilitre of carbon bisulphide, immediately replace the cover, with several heavy volumes on top to keep it from moving, and then close the edges by means of putty. The carbon bisulphide vaporizes rapidly. Although a high temperature greatly increases its energy it is not indispensable for the production of excellent effects as I have convinced myself in the course of my operations. The thermometer has varied between plus 10° and plus 28° centigrade, it has even decended to plus 1° and nearly to zero and yet the result has never been anything but satisfactory. When I opened the box at the end of three days (the time required for the operation) the nauseous odor which immediately escaped from within proved to me

each time that the interior was filled with gas of which the ("anesthesique") action is so powerful. No larva could escape—not even those the most thoroughly protected in the debris of the plants that they had discovered. I have counted 50 of them on one sheet of my herbarium which contained the flowers of *Ficus Carica*. Usually they at first preserve their white color, but soon they take a brown tint more or less dark. The odor of the carbon bisulphide is soon gone; in a few hours the fasiculi do not retain a trace of it. As this substance is very inflammable it is prudent not to light a fire or use a candle or lamp in the same room where one is making use of it.

The plants which have been subjected to its action will not be entirely protected from future attacks, but they will be much less liable. * * * It is probable that one would not be obliged to make use of it again before four or five years, and this occasions neither trouble nor loss of time. Museums of Natural History and the possessors of large herbaria should make use of larger boxes in order to place more in them at the same time, increasing in proportion the quantity of carbon bisulphide."

Botanical Rambles in Middle Florida.—One accustomed to the open, rolling and highly cultivated country of the North will note a marked contrast in this Coral State. In leaving the river banks of the St. John's it was my expectation to meet at frequent intervals good sized tracts of unwooded and cultivated lands, but there appeared, along the entire line of rail to the Gulf, nothing but a continued unbroken pine forest with here and there a village surrounded by open lots and a few fields. Yet, notwithstanding its sylvan character, there are, away from the rail, open places of frequent occurrence, of ponds, lakes, barrens, savannas, abandoned and cultivated plantations.

On approaching Baldwin, a junction station twenty miles from Jacksonville, and passing through open, low and wet piny lands, the Atamasco lily came in view at frequent intervals, as well as the Wampee and narrow leaved *Amianthium*. Gainsville was my objective point, and here, upon arrival March 13th, I made the necessary arrangements for the study of its immediate spring flora. The early season, with the frequent and extensive fires in the forests at this time led me to anticipate a meager harvest; yet, the elevated and rolling land, the varied and fertile soil and the advanced and luxuriant vegetation rendered my few days ramble here both interesting and profitable. In this vicinity, as elsewhere, are small meandering streams defined by marshy banks, dense thickets and sometimes impenetrable jungles of woody undergrowth. Just in such places occurred *Chionanthus Virginica*, L. white with fringed flowers, *Bignonia capreolata*, L., laden with beautiful red trumpet blossoms, *Magnolia glauca*, L., beginning to unfold its fragrant petals, *Pyrus arbutifolia*, L. var., *erythrocarpa*, Chapm., *Amorpha fruticosa*, L., *Leucothoe racemosa*, Gray, *Decumaria barbara*, L and *Smilax Walteri*, Pursh. In the streets of the town and on the dry sandy railroad banks grew in large mats *Acanthospermum xanthioides*, DC.; while in the wet side ditches appeared plentifully, both in flower and fruit, *Mayaca Michauxii*, Schott & End., and *Jussiæa leptocarpa*, Nutt; and on the shady banks *Pyrrhopappus Carolinianus*, DC., *Lonicera sempervirens*, Ait., *Allium striatum*, Jacq., *Carex dasycarpa*, Muhl., with occasionally a flowering specimen of *Lactuca Canadensis*, L. var., *sanguinea*, T. & Gr. Frequently one will observe in the dry portions of these extensive forests a few small trees or scrubs of *Quercus Catesbei*, Michx., instead of pine and as land marks of apparent barren soil. While such slopes or ridges present no favored locations for particular plants except this oak and *Berlandiera subacaulis*, Nutt, they yield, nevertheless, with the adjacent dry soil such plants as *Asimina pygmæa*, Dunal, now coming in flower, *Astragalus pumilum*, Michx., *Astragalus villosus*, Nutt., *Asclepias amplexicaulis*, Michx., *Jatropha urens*, L., var., *stimulosa*, J. Mueller, *Croton argyranthemus*, Michx., and *Rhynchospora plumosa*, Ell.

There appeared near this inland town, as not observed elsewhere, large and dense forests of unusually tall exogenous trees of which the Magnolia, the Hickory, and the

Swamp White Oak raised their spreading tops fully a hundred feet in the air. The land, covered by these stately monarchs, is quite rolling, composed of a mixed and fertile soil of clay, sand and vegetable mold. Penetrating these deep forests, with compass, very few herbaceous plants were seen, but an abundance of woody undergrowth of various entangling vines and shrubs of which *Symplocos tinctoria*, L'Her. was the most interesting and a new acquisition.

Gainsville is a favorite resort for the invalid, probably in part due to the attractions of its rural scenes, dry atmosphere and moderate charges of living. A Brooklynian who had recovered his health here, and in consequence enjoyed excellent spirits, became a good friend and companion in my daily rambles. We engaged upon a days trip through a varied country to the Alachua or Sink, a large lake with a subterranean stream to the ocean. The botany, however, at our place of approach was disappointing, for we had been preceded—the lowing herd had cropped close the sloping banks, and the long snouted swine had subsoiled the bottom flats. I thought of Wm. Bartram who appeared here a hundred years ago [1774], and stood upon the banks of this same "Great Sink," so minutely and graphically described in his travels, the 'extensive Alachua savanna' as 'a level green plain, above fifteen miles over and fifty miles in circumference,' with the abundance of game 'disturbed, in its quiet retreat, only through the invasion of these Elysian fields by the painted and fearless Seminole." Our trip, however, to these historic grounds of the once great tribe of Alachuans, the Ancient Floridians, was not wholly fruitless; for, on the way we increased our list with the common *Ptelea trifoliata*, L., *Crataegus parvifolia*, Ait., and *Prunus umbellata*, Ell., *Vaccinium arboreum*, Marshall, *Ilex Cassine*, L., *Stachys Floridana*, Shuttl., *Corallorhiza odontorhiza*, Nutt, two feet high, *Aspidium patens*, Swz., and *Bumelia lycioides*, Gaert., var. *reclinata*, Gray, with indications of good plants obtained on a subsequent visit.

In this country one can often walk for hours through a comparative sameness of growth and then suddenly and unexpectedly enter a changed and interesting vegetation. There seems no certain guide in the character or situation of the land to mark localities of certain plants like in the North, where the fertile peat bogs and marl beds, the cold sphagnous swamps and deep hemlock forests, and the exposed mountain ridges and Alpine peaks are good indices. But in the detection of local species here one depends apparently on mere luck.

On the morning of the 19th there appeared the first and only frost of the season, and in consequence the banana leaves assumed a bronze tint, the early vegetables a scalded appearance with drooping foliage, and the floral display of the forest a generally melancholic hue, thus practically ending field work for a time, and I made my departure southward.

In the close of June on my return North, I made a sojourn here for a few days. And behold what a change! The variety and luxuriance of the vegetation had covered many of my former landmarks, and the place appeared not the same. With the limited time and good prospects I set diligently to work and added good specimens of *Clematis reticulata*, Walt., *Cocculus Carolinus* DC., *Polygala leptostachys*, Shuttl., *Krameria lanceolata*, Torr., *Tephrosia hispidula*, Pursh., *Aeschynomene hispida*, Willd., and *viscidula*, Michx., *Zornia tetraphylla*, Michx., *Rhynchosia tomentosa*, T. & Gr. var., *erecta* T. & Gr., *Ludwigia arcuata*, Walt., *Melothria pendula*, L., *Spermacoce involucrata*, Pursh., *Tetragonotheca helianthoides*, L., *Verbena Carolineana*, Mx., *Asclepias cinerea*, Walt., *Eriogonum longifolium*, Nutt, and *tomentosum*, Mx., *Euphorbia cordifolia*, Ell., *Schwnocaulon gracilis*, Gray, flowers and fruit., *Fimbristylis Warei*, Torr, *Carex Elliottii*, Schw. and Torr., *Panicum Walteri*, Ell., *Actinomeris intermedia*, Chapm., *Boerhaavia erecta*, L. and *Habenaria repens*, Nutt. All in fine state for collection and with three exceptions the only locality observed.

DR. A. P. GARBER.

ADDITIONS TO THE FLORA OF ARKANSAS.—The latest, and most complete list of the flora of Arkansas, is the catalogue given by Leo Lesquereux in his report of a botanical survey of that State, made in 1860. The catalogue also gave the names of such species as were observed by M. Nuttall. I have found the following species in Arkansas in addition to those in the catalogue:

Anemone Caroliniana, Walt.
Thalictrum anemonoides, Michx.
Ranunculus abortivus, L.
R. pusillus, Poir.
Dicentra Cucullaria, DC.
Cleome pungens, Willd.
Viola pubescens, Ait., var. *eriocarpa*, Nutt.
V. blanda, Willd.
Silene Virginica, L.
Cerastium nutans, Raf.
Claytonia Caroliniana, Michx.
Linum sulcatum, Riddell.
Geranium Carolinianum, L.
Impatiens fulva, Nutt.
Ceanothus microphyllus, Michx.
Acer rubrum, L.
Polygala sanguinea, L.
Indigofera Anil, L.
Phaseolus diversifolius, Pers.
P. pauciflorus, Benth.
Galactia mollis, Michx. I presume the same plant is meant by the *G. pilosa*, Nutt., of the catalogue.
Cassia nictitans, L.
Agrimonia Eupatoria, L.
Amelanchier Canadensis, T. & G.
Ammannia humilis, Michx.
Jussiæa decurrens, DC.
Circæa Lutetiana, L.
Melothria pendula, L.
Pastinaca sativa, L.
Polytænia Nuttallii, DC.
Discopleura capillacea, DC.
Cicuta maculata, L.
Osmorrhiza longistylis, DC
Lonicera flava, Sims.
L. sempervirens, Ait.
Galium Aparine, L.
Oldenlandia glomerata, Michx.
Fedia radiata, Michx.
Aster miser, L.
Erigeron Philadelphicum, L.
E. strigosum, Muhl
Solidago puberula, Nutt.
Heterotheca scabra, DC.
Chrysopsis villosa, Nutt.
Coreopsis discoidea, T. & G.
C. aristosa, Michx
Antennaria plantaginifolia, Hook.
Lobelia brevifolia, near Little Rock, *Engelmann.*
L. puberula. Michx.
Halesia tetraptera, L.
Plantago Patagonica, Jacq. var. *gnaphalioides*, Gray.
Hottonia inflata, Ell
Collinsia verna, Nutt.
Gratiola sphærocarpa, Ell.
Gerardia tenuifolia, Vahl.
Leonurus Cardiaca, L.
Onosmodium Caroliniauum, DC.
Lithospermum angustifolium, Michx.
Cynoglossum Morisoni, DC.
Ellisia Nyctelea, L.
Cuscuta inflexa, Engelm.
Polypremum procumbens, L.
Forsteronia difformis, DC.
Asclepias quadrifolia, Jacq.
Gonolobus lævis, Michx.
Amarantus spinosus, L.
A. chlorostachys, Willd.
Polygonum incarnatum, Ell.
Rumex Engelmanni, Ledeb.
Stillingia sylvatica, L.
Crotonopsis linearis, Michx.
Maclura aurantica, Nutt.
Corallorhiza odontorhiza, Nutt.
Bletia aphylla, Nutt.
Pardanthus Chinensis, Ker.
Sisyrinchium Bermudiana, L.
Allium mutabile, Michx.
Uvularia grandiflora, Smith.
Juncus Canadensis, J. Gay.
Fimbristylis capillaris, Gray.
F. lasa, Vahl.
Carex crinita, Lam.
C. stenolepis, Torr.
C. vulpinoidea, Michx.
C. stipata, Muhl.
C. stellulata, L.
C. virescens, Muhl.
Alopecurus aristulatus, Michx.
Gymnopogon racemosus, Beauv.
Poa sylvestris, Gray.
Eragrostis poæoides, Beauv. var. *megastachya*, Gray.
Festuca nutans, Willd.
Uniola latifolia, Michx.
Elymus striatus, Willd.
Phalaris intermedia, Bosc.
Paspalum Floridanum, Michx.
Panicum latifolium, L.
Rottboellia cylindrica, Chapm.
Cheilanthes lanuginosa, Nutt.
Onoclea sensibilis, L.
Botrychium Virginicum, Swartz.

A few of the foregoing were included in Lesquereux's catalogue, but were marked as supposed to occur.—GEO. D. BUTLER, *Limestone Gap, Ind. Ter.*

THE STUDY OF FUNGI.—I wish to call the attention of botanists to the splendid opportunity for distinguishing themselves, which this Western country offers in the

study of Fungi. The fame waiting to reward the careful examination and study of the Fungi of the Mississippi Valley will be found sufficient to gratify the ambition of the most aspiring botanist.

The State of New York, perhaps, has been more thoroughly studied thus far in reference to its Fungal Flora than any other State of the Union. The State Botanist, Prof. Charles H. Peck, has now for several years devoted himself with unwearied industry to the identification of species with European forms and to the naming and describing of native species.

To illustrate what we may state in reference to Fungi in general let us take as an example the genus *Agaricus*. And I may here remark in passing that of this noble genus Prof. Peck has himself named and described nearly 150 species. More than half the species of this genus thus far found in North America are European and may be determined by the use of Cooke's Hand Book of British Fungi, or better still by Fries' Hymenomycetes Europæi. A large part of the remainder will be found in Prof. Peck's reports in the published volumes of the New York State Museum of Natural History. A few other species and all new species should be submitted to Prof. Peck or some other Fungologist for description.

The study of North American Fungi has as yet been chiefly confined to the Eastern United States; the Fungi of the Mississippi Valley have received but little attention. To illustrate what yet remains to be done for the Fungal Flora of North America let us refer again to the genus *Agaricus*. Elias Fries in his Hymenomycetes Europæi, Edition 2, 1874, enumerates 1,202 species. Scarcely 400 species of *Agaricus* have as yet been determined in this country. Who can say that the number of our species is greatly inferior to that of Europe? May it not be safe to say *that half the species, many genera, and some orders of North American Fungi are not yet studied?*

Mr. Charles C. Frost enumerates in the Amherst Catalogue upwards of 1,200 species of Fungi, all found in the single locality about Brattleboro, Vt. 155 species belong to the highest genus *Agaricus*, and nearly 600 to the highest family, the HYMENOMYCETES. It is not likely that every locality is so rich in species of Fungi as this one; but it is very probable that their number always exceeds that of the Flowering Plants.

The student will not find the genera and species of the higher Fungi, the AGARICINI and POLYPOREI, for example, any more difficult to make out than those of many orders of Flowering Plants. Prof. Peck's Twenty-third Report contains a Manual of the most common species of the higher Fungi, which forms a good introduction to the study of North American Fungi. Valuable directions in reference to the collection and preservation of specimens will be found in several of these Reports and especially in the Twenty-seventh.—A. P. MORGAN, *Dayton, Ohio*.

BOTANY IN JAPAN.—In a private letter from Dr. D. B. McCartee of the Imperial University of Japan, the following is of general interest:—[ED.]

"The Japanese have paid a great deal of attention to Botany, and have published many books, some of them quite expensive ones, on the subject. They arrange the genera after the Linnæan System, although some of them give the 'Natural Orders,' substituting Japanese names for the English or Latin ones. The illustrations are quite well drawn and the minute parts are frequently drawn magnified, so that with the habitat and description accompanying, the identification is generally comparatively easy. The Japanese also have colleges of Agriculture, and publish a Monthly Magazine on agricultural subjects, and the Department of Education is now issuing a work in parts on the economical products of the different provinces of Japan, with well executed illustrations.

SOME NOTES ON VARIATIONS IN PLANTS IN IOWA (observed for the most part in July and August, 1873).—A white *Vernonia*, found near Chariton, apparently a var. of *Vernonia fasciculata*, Michx., specimens fine and abundant.

Another variety of the same species, probably, is quite abundant in Monroe county. It is quite smooth, leaves linear-lanceolate, and very thickly punctate. This variety is so common that it should receive some notice in our botanical text books.

Rudbeckia triloba, L. presented some remarkable variations. Near Moulton in the southern part of the State, in a thicket growing along with the ordinary forms, I found some with ray florets a rich, velvety purple; some with purple and yellow rays, very much like those of *Coreopsis tinctoria*.

Verbena hastata, L. runs into numerous varieties. I found scores of pure white flowered specimens, growing by the roadside, along with the blue flowered kind, scattered along for more than a mile, between Moulton and Unionville. Around Albia I found it of various shades of color, pink, purple, pink and purple, pink and white, as well as white. I had seen a rose-colored variety previously in Michigan. And here I will refer to a variety of *Rudbeckia speciosa* quite common in some localities around Grand Rapids. It was very smooth, both stem and leaves, except the margin of the leaves were often rough. Otherwise there was no difference between this and the ordinary form.

A very strongly cork-winged oak attracted my attention not a little; but as I could find no description bearing on this feature, I could come to no conclusion concerning it. It was a small tree, with leaves much like those of *Q. nigra*, but this and another small oak that I did not have time to give much attention to, often had stellate pubescent leaves. The common Witch Hazel presented a like feature, though that occurs with stellate pubescent leaves in the East as well as at the West. In fact the stellar pubescent leaves are oftener found than any other form, as far as my observations extend; and I have often inquired why this feature was not noticed by writers.

Found quite a number of specimens of *Asclepias*, near Albia, agreeing substantially with the description of *A. amplexicaulis*, Mx., but that is said not to grow so far north. Now I will refer to some forms and variations noticed in various places.

A *Vicia Caroliniana* found quite abundant in one locality in Mississippi near Pontotoc, with white flowers.

A strictly erect *Clitoria*, with flowers in pairs and leaves smooth and glaucous, near same place.

A white variety of *Phlox reptans* found near Grand Rapids.

June 21, 1873. Found a singular *Allium*. Spathe 3 leaved, thin and pointed: flowers few, purplish, mixed with bulblets, stamens broad at base, anthers two lobed, somewhat sagittate; leaves two to three, thin, nearly radical, shorter than stem, which was 15 inches high; bulb ½ by 1 inch, coated with a strong net work of whitish fibres, growing in moist soil. Not far from this I found a branching *Asclepias Cornuti*.

August 4, 1873. Saw several clusters of blossoms on a common locust tree in Iowa, and last summer July 31, saw the same feature in Connecticut. Aug. 20, 1873. Saw a cherry tree well covered with its second crop of fruit, which was nearly half grown.

I have in my possession a blossom of the common Snowball, picked Oct. 30, 1873, in a yard in Grand Rapids, Mich., and the same shrub, I think, had blossoms on it Sept. 18, the same year.

Bidens connata and *B. frondosa* are frequently met with around Grand Rapids, with rays 5 to 8. Sometimes the rays are quite conspicuous.

The past summer I found an abundance of *Dactyloctenium Egyptiacum*, Willd., in several localities in Windsor and some in Hartford, but plants much smaller than specimens of the same grass found in Philadelphia.

Sept. 24, '76. Found *Lycopis Virginicus* with runners six feet long, and *Hydrocotyle Americana*, with runners three feet long. Saw also, *Spiræa salicifolia* in bloom for second time this season.

Linaria vulgaris in bloom October 14.

Nov. 4. Found *Houstonia caerulea* in bloom. *Potentilla Canadensis* and *Solidago latifolia* also in bloom.

Nov. 12. *Ranunculus acris* in bloom, and *Aster sagittifolius*.

Nov. 17. *Aster oblongifolius* still in bloom. This seemed remarkable as it had been quite cold, and the mercury down to 20°.

Sida spinosa, L. is found here. Is it common for that to grow wild so far to the North? N. COLEMAN.

IOWA PLANTS.—The BOTANICAL GAZETTE for January has an article on recently discovered plants of Iowa, about which I wish to say a few words. There must have been some oversight in the matter or several of them would have been added to the State catalogue some time since. The *Trifolium reflexum* was found by myself in 1868, in Troy township, Monroe county. I found *Tradescantia rosea* and *T. Virginica*, as also *T. pilosa* in 1867, all three of which I transplanted into my garden, where they grew finely. *Oxybaphus angustifolius* was found the same year, and some specimens presented the remarkable feature of having the branches opposite. I do not now remember whether *Rosa lucida* was first seen in 1868 or 1869, or *Œnothera pumila*, but I found them both. I spent my summer vacation of 1873 in Iowa, and while there sent nearly three hundred names of species and varieties, not then catalogued, to the State Botanist, many of them seen for the first time in Iowa, that summer. I have not the list of names at hand, but think I sent those of *Sonchus oleraceus* and *Lespedeza violacea*. Among those seen for the first time in Iowa in 1873 were *Cassia Marilandica* and *Solanum Carolinense* and *S. Virginianum*. N. COLEMAN.

THE SHIPPING OF LIVING PLANTS.—It is probably known to many that on the 20th of October last I sent to the Botanic Garden, at Sidney, New South Wales, by request of the Australian Commission at the Centennial Exposition, a suite of New Jersey aquatic plants, in which were *Nelumbium luteum*, *Nymphæa odorata*, *Nuphar advena*, *Sarracenia purpurea*, *Pontederia cordata*, and *Vaccinium macrocarpon*. Where possible, the roots and seeds both were sent. They were packed in wet sphagnum, and sent in a tight wine cask. To make matters sure, the lot was sent overland to San Francisco. The venture has been heard from. The seeds all arrived right, and some of them had sprouted. The rhizomes of the *Nymphæa* suffered most, having badly softened on the way; so that it is quite doubtful whether these can be made to live. I hope to try another venture this year, adopting a different method in the packing. As the shipping of living plants to a great distance is of practical importance, the method and result shall be given to the BOTANICAL GAZETTE.—S. LOCKWOOD. *Freehold, N. J. March* 24.

We are pleased to acknowledge the receipt of eight botanical pamphlets from M. Alph. DeCandolle. They are "Monstruosites Vegetales," 1841, with seven plates, "Lois de la Nomenclature Botanique," 1867, A Reply to Various Questions and Criticisms made upon the former, 1869, "Experiences sur des Graines de Diverses Especes plongees dans de l'eau de mer," by M. Gustave Thuret, 1873, "Existe-t-il dans la vegetation actuelle des Caracteres Generaux et Distinctifs que permettraient de la reconnaitre en tous pays si elle devenait fossile?," 1875, "L'Age d'un Arbre a-t-il une influence sur l'epoque moyenne de sa feuillaison?," 1876, "Sur la designation de la direction des spires dans les plantes," 1876, "Observations sur l'Enroulement des Vrilles, by M. Casimir De Candolle, January 1877. The last pamphlet is the only one that requires special mention at this date. We have now before us the works of three generations of De Candolles, giving us a notable example of inherited tastes. In this article on the coiling of tendrils, M. C. De Candolle says that his researches were suggested by Darwin's work on the "Movements and Habits of Climbing Plants." The experiments are conducted for the most part with the tendrils of the Bryony, which do not roll themselves in one direction, but from a set of helices alternately right and left-handed. It

seems that all isolated tendrils, entirely free or fixed only by one of their extremities coil in one uniform direction through their whole length: that all those whose ends are fastened produce at least two helices of opposite kinds; that tendrils free at both ends coil most often from left to right, just as those which have not been separated from the plant; that isolated tendrils which are fastened at the summit, are as apt to coil in one direction as the other. The helices formed by the same tendril ought always to be an even number.—[Ed.]

Recent Publications.—*American Journal of Science and Arts*, March. Dr. Gray has a short note on *Dextrorse and Sinistrorse*, or which is right and which is left, as applied to twining, overlapping in flower buds, and course of the spiral in phyllotaxis? Two opposite views are held, the one of which supposes the observer within the coil, the other outside. The former view was adopted by Linnæus, Mohl, Palm, A. Braun, Alph. DeCandolle, and others, the latter by Bentham, Darwin, and Dr. Gray, and it seems to us to be the much more reasonable and natural view. The *Botanical Necrology* of 1876 contains the names of Adolphe Theodore Brongniart, John Joseph Bennett, Christian Gottfried Ehrenberg, Leopold Fueckel, Edward Newman, Joseph Carson, M. D., and Wilhelm Hofmeister.

American Naturalist, March.—in an article entitled, "Hints on the Origin of the Flora and Fauna of the Florida Keys," L. F. DePourtales comes to the conclusion that the vegetation of the Florida Keys is largely West Indian. A list of Lichens found growing within twenty miles of Yale College is contributed by F. W. Hall. Some large trunks of *Kalmia latifolia* are put on record as occurring on the extreme western border of South Carolina. "One trunk, at a foot or so from the ground, measured four feet one and a quarter inches in circumference, and, rising without division, maintains a size approaching this and gradually lessening, for six or seven feet. C. S. Sargent has a note on the "Dichogamy of Agave" confirming by observation Dr. Engelmann's statement, in his monograph on Agave, that the flowers of the genius are "vespertine or nocturnal, and *proteranderous*."

Bulletin of the Torrey Botanical Club, February.—J. B. Ellis describes eleven new species of Fungi, one *Stereum*, one *Pistillaria*, one *Hysterium*, one *Dermatea*, three *Peziza*, and four *Spharias*. Charles H. Peck describes a new fungus found at Westchester, Pa. Geo. E. Davenport notices some variations in *Lomaria* and *Polypodium*.

The Gardener's Monthly, March.—Mr. Meehan has an interesting note on the "Interpretation of Varying Forms" which also appears in the Proceedings of the Philadelphia Academy of Natural Sciences. We make the following extract: He said that "on a recent visit to the Academy, the distinguished botanist, Dr. Engelmann, had pointed out that some oaks had lobed leaves even in early infancy, while others had entire leaves; but that those which had early lobed leaves assumed more entire leaves when mature, and those which had entire leaves when young, had lobed leaves when fully grown."

Field and Forest, March.—Mr. J. W. Chickering gives a short list of some local plant catalogues.

Address: John M. Coulter, Hanover, Ind.
M. S. Coulter, Logansport, Ind.

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Bryological Notes; by C. F. Austin.—Encalypta Selwyni *n. sp.*—Inflorescentia capsula peristomioque *E. procera*, differt tamen statura humiliore, calyptra longissime infra capsulam producta, basi profunde inciso-laciniata limbo fusco ornata, foliis margine magis minusve revolutis, superioribus late lingulatis costa percurrente vel excurrente et pilo longo hyalino subdeplanato instructis.

Vancouver's Island, May, 1875. *Macoun.*

Calyptra narrow, nearly or quite as long as in *E. contorta* (Wulf.) *Hopp.* (*E. streptocarpa*, Hedw.) yellowish with a brownish or greenish tinge, with a broad thin fuscous border, and more or less incised at the base, the fringe persistent and becoming white with age, persistent for more than one year, the whole surface minutely and rather remotely papillose. Pedicel remotely and minutely papillose, dark red, solid, the apex twisted to the right (rarely to the left). Capsule solid, strongly sulcate and distinctly twisted to the right, cylindrical. Peristome perfectly epapillose, elongated; the outer dark red, with the teeth filliform and distantly nodulose; the inner yellow, with the cilia nearly as long as the teeth and arising from a broad membrane; annulus not seen. Stems short and subgregarious. Leaves somewhat carinate, slightly undulate and more or less revolute on the margin in the middle; the lower ones oblong or oblong-linear obtuse with the costa usually percurrent; the upper ones broadly lingulate acute and with the costa extending into the long hyaline flattish *pilum*. Costa densely papillose on the back and rufous below; nearly naked, yellowish and somewhat pellucid towards the apex. Inner perichætial leaves very small and acute, piliferous. Inflorescence monœcious and bisexual in the same plant. Pistils sometimes naked and axillary.

Syrrhopodon ? crispus, *n. sp.*—Humilis, cæspites compactos inferne fuscescentes superne pallido-fuscescentes vel flavido-virides formans; foliis siccitate valde crispatis (*Orthotrichum crispulum* æmulantibus) in humore strictis suberectis a basi tenuissima sensim angustata anguste panduræformi-ligulatis planis papillosis, apice obtuso ac sæpe retuso, solum parte inferiore valde hyalina marginatis, parte superiore densissime granuloso-areolatis papilloso-crenulatis haud lamellatis, costa lutescente percurrente; sterilis. (An *Calymperes* species?)

On rotten wood, Florida, Feb. 1877, *J. Donnell Smith.*

A very distinct species with much the appearance of a sterile compact growth of *Dicranum montanum*, which is found on rotten wood in open places in the north.

Grimmia Coloradense, *n. sp.*—Monoica (autoica) pulvinato-cæspitulosa; caule 2–3 lineas longo fastigiato-ramoso, foliis caulinis erectiusculis lanceolatis vel sublingulatis carinatis muticis vel superioribus hyalino-apiculatis margine magis minusve incrassatis nonnunquam supra medium leniter recurvis, reti minutissimo denso leniter pellucido, basilari paulo majori, costa tenui plerumque longeante apicem evanida, perichætialibus erectis latioribus basi laxe textis pellucidis margine sæpe subundulatis apice longiuscule hyalino-mucronatis (mucrone serrato) costa sub apice evanida; capsula in pedicello recto perbrevi immersa globosa macrostoma, peristomii dentibus pallido-rubris brevibus latis apice subcribrosis siccitate patenti-recurvis humiditate incurvis; calyptra operculoque haud visis.

Colorado, 1876, *Brandegee (Rau)*.

Among the smallest of the genus; readily distinguished by the carinate mutic or very shortly pointed leaves somewhat thickened and often slightly recurved on the margin above the middle, with the costa ceasing far below the apex, and by the short straight pedicel.

Macromitrium rhabdocarpum, Mitt.—Monoicum; foliis siccitate valde crispatis in humido subflexuosis patentibus lineali-lanceolatis obtusiusculis subapiculatis subcarinatis minutissime crenulatis margine planis, areolatione minuto superne subrotundo granuloso basilari longiori sed haud latiori, costa percurrente, capsula ovata ovalive distincte 8-costata abrupte in pedicello longo defluente, ore parvo, operculo rostrato, peristomii dentibus brevibus pallidis fragilis, calyptra vix ad capsulæ basim producta valde plicato-costata basi pluries lobata parce pilosa straminea apice leviter fusca.

In the crotch of a recently cut Live Oak. St. Augustine, Florida, Feb. 1877, *J. Donnell Smith*.

Mode of growth much as in *Drummondia clarellata*. Capsule composed of minute cells, *not* conspicuously colored at the mouth.

Bryum Biddlecomiæ, *n. sp.*—A *Br. Warneo*, differt foliis distinctissime marginatis margine late revolutis apice obsoletissime serratis, capsula majore (pendula), operculo mutico vel minutissime papillato.

Colorado, *Miss H. J. Biddlecome*.

Stems rather short, innovately branched, the branches flagelliferous (as in *Br. Warneum*, Bland.). Leaves broadly ovate or ovate-lanceolate, entire, cuspidate by the stout excurrent costa, broadly revolute on the margin, with a narrow subsolid border. Capsule rather large, pendulous, with a rather long neck which is much constricted when dry, constricted under the mouth, pale, becoming light fuscous. Operculum rather large, convex, mutic or very minutely papillate, pale, with a narrow rim composed of 2 or 3 rows of slightly different (pale) cells. Annulus rather narrow for the genus, revolute. Peristome with the ciliola imperfect or wanting. Spores twice as large as in *B. bimum*.

Bryum Macounı, Aust. Ms. (1865).—Dioicum robustum, caespites compactos superne pulchre miniatos vel flavescentes formans; caule magis minusve elongato subsimplici julaceo strictiusculo, foliis erectis appressis arcte imbricatis subrotundis vel ovatis valde concavis obtusissimis subcucullatis, integerrimis haud vel indistincte marginatis, margine plano, reti pro genere parvo superne rhombeo inæquali inferne subquadrat , costa valida sub apice finiente; capsula horizontali vel subpendula a collo longiusculo anguste elliptica saturate vel atro-rubra solidissima, operculo conico acutiusculo fragili, annulo lato incrassato solido, peristomio externo vinoso-rubro, interno libero membrana latissima, brevi ciliolis perfectis.—Var. *subcatenulatum*.—Foliis inferioribus subdistantibus apertis, superioribus raptim in gemmulam magnam congestis, caule ex apice, interrupte continuo (catenulato).

Near Belleville, Canada West (the var.); also Vancouver's Island, *Macoun* (sterile). The fertile plant is from Oregon, recently sent by *Mrs. Roy*, of Owen Sound, Canada.

Resembles *Br. miniatum*, Lesqx.: but that is smaller, with narrower often acute leaves more or less distinctly margined, and often rather broadly revolute on the margin, with the costa often percurrent, the areolation different, etc.; and, furthermore it appears to be too near *Br. Muhlenbeckii*, Br. Eur. (*Br. Muhlenbeckii* has been found in the mountain ravines of Pennsylvania (*Wolle & Rau*), but without fruit.)

Bryum Rauei, *n. sp.*—*Br. Muhlenbeckii* affinis, differt tamen foliis nitidissimis uniformiter angustissime marginatis margine nunquam recurvis reti longiore superiori vix rhombeo, etc.

On wet rocks, Alpine regions of the White Mountains (abundant); also at Cauterskill Falls, Catskill Mountains.

Forming extensive dense shining dark green or often reddish cushions, on wet, sloping rocks. Leaves oblong, obtuse or acutish, entire, narrowly but distinctly margined, plane on the margin; cells at the base more or less quadrate, above oval or oblong; costa ceasing below or at the apex. Fruit not seen. Much like the var. of *Br. Macouni*, mentioned above, but that has the leaves all obtuse, and very indistinctly if at all margined. There is another sterile (always?) *Bryum* growing in great profusion on the White Mountains, associated with the preceding and with *Leptotrichum heteromallum*. It resembles *Mielichhoferia nitida* in most respects, but is larger with the stems often flagelliferous. It also occurs on the mountains of New York and New Jersey, and I have had it in my herbarium for the past ten years under the provisional name of *Bryum compactum*.

Dichelyma cylindricarpum, *n. sp.*—Capsula cylindrica flavescente in pedicello fere unciam longo ex perichætium longo exserta subirregulari siccitate subcostata, operculo acuto, alte conico, annulo——?peristomio externo longissimo dentibus solidissimis opacis papillosis vix nodulosis, interno paulo longiore toto cancellato papilloso, columella angusta longe emergente; foliis caulinis lanceolato-subulatis subcirrhato-falcatis integerrimis vel apice extremo serrulatis, costa terrete longe excurrente, perichætialibus pedicello dimidio brevioribus subtorquatis obtusis (semper?)

Oregon; communicated by *Mrs. Jessie Roy*.

Nearest to *D. uncinatum*, Mitt.; but readily distinguished by the capsule being twice as long and on a much longer pedicel, peristome much longer and papillose, stem-leaves with the costa more distinctly excurrent into a narrower more acute terete point, etc.

In *D. uncinatum*, collected in British America by Macoun, the peristomal teeth are subpellucid, distinctly nodulose, epapillose, etc.; columella broad; stem-leaves with a flattish point; perichætial leaves often longer than the pedicel, twisted (Mitten to the contrary notwithstanding), operculum not rostrate in the single example seen by me.

Fabronia Donnellii, *n. sp.*—Foliis oblongo-lanceolatis strictiusculis nonnunquam submarginatis obsolete serratis subecostatis, reti angusto basilari majore subquadrato inflato, capsula ovali subincurva, peristomii dentibus 16 majusculis siccitate subhorizontaliter incurvis humiditate erectis sublanceolatis integris apice leniter recurvis articulationibus dorso valde prominentibus: monoica; flore masc. parvo, juxta fœmineum posito

On the branches of a recently cut Live Oak, Florida, Feb. 1877, *J. D. S.*

Mode of growth and form of capsule much as in *Hypnum microcarpum*, but smaller in all its parts, with narrower and more narrowly reticulated leaves, the inflated cells at the basal angles more numerous, peristome different, etc. Remarkable for the prominent articulations of the peristomal teeth.

Brachythecium (*Cavernularia*) splendens, *n. sp.*—Caule pluries vage ramoso, rameis brevibus subjulaceis confertis subflexuosis, foliis splendentibus plurifariis arcte imbricatis erectis siccitate haud mutatis læte viridibus a basi latissime cordatis late triangulari-lanceolatis sensim acuminatis leviter bi-quadriplicatis vix concavis, margine plerumque plana minute serrata, angulis excavatis, costa tenui longe sub apice finienti, areolatione minuto angustissimo infra medium sensim breviori et latiori ad basim infimam subabrupte inflato (præcipue ad angulos).

On Palmetto trunks, St. Augustine, Florida, Feb. 1877, *J. Donnell Smith*.

Resembles *Br. lætum* Brid.; but is readily distinguished by the more lustrous less strongly sulcate leaves with a cordate auriculate base. Inflorescence and fruit not seen.

Hypnum (*Myurium?*) Coloradense, *n. sp.*—Differt a *M.? Herjedalico*, Schimp. *Synop.*, caule compresso foliis subplicatis basi subrotundis margine inferne vix recurvis. (An *Rhynchostegii* species?)

Colorado, *Miss H. J. Biddlecome*.

Robust; stems erect or at length prostrate, compressed, sparingly branched. Leaves erect, appressed, imbricated, not changed in drying, oblong-ovate, concave, subplicate, the apex abruptly piliferous, the *pilum* often recurved, the margins entire or subserrate scarcely recurved at the base; the base somewhat narrowed and rounded, the angles excavated; cells narrow and nearly straight and uniform except at the very base where they are shorter and slightly inflated (oval or roundish), but not more pellucid.—The reticulation of the subplicate leaf suggests a *Camptothecium*, the pilum at the apex is much as in *Eurrhynchium piliferum*, while the general habit of the plant is *Rhynchostegioid*.

The April Flora of Cedar Keys, Fla.—Entering a new country the change brings to view much that is novel, interesting and instructive to an observing mind. Leaving with the setting sun the rolling upland country and passing through the lowlands of pine and hummock, we reached at night the west coast at Cedar Keys. In the morning a varied scenery presented itself. From the center of a V-group of keys, twenty or thirty in number, extended to my right the wide expanse of the Great Gulf of Mexico, and to my left the low line of pines defining the distant shores of the mainland until lost in the misty horizon. Of these keys or islands some are small, low and frequently inundated by the tidal wave. Such yield invariably *Avicennia tomentosa*, Jacq., known as the Black Mangrove, *Borrichia frutescens*, DC., *Salicornia fruticosa*, L., var. *ambigua*, Gr., and little else save beds of a small bivalve known here as the "coon oyster." The more elevated islands, traversed by sand ridges, knolls and shell mounds, contain a flora usually rich in species; and notably prominent appear dense shrubbery and dwarfed trees of which *Quercus aquatica*, Catesb., and *Persea Catesbyana*, are extremely abundant.

The backwardness of the vegetation, the damp atmosphere and the rough sea at this season occasioned by the continued strong sea breezes, and the uninviting appearance of the village with its legitimate ratio of the colored race, would have offered no inducement to a prolonged stay. The desire, however, for mail communication from the North caused me to remain for a time, and meanwhile devote my attention to a careful study of the vegetation of the Keys and accessible shores of the mainland.

In the streets of the town and along the railroad occurred in great abundance *Sida althoifolia*, var. *aristosa*, DC., and *stipulata*, Cav., and *Abutilon Avicennæ*, Gærtn., with red flowers. Also *Euphorbia heterophylla*, L., *Cassia occidentalis*, L. and *obtusifolia*, L., the last two so often seen subsequently in the side streets and alley-ways of old towns and villages. An aged citizen of Tampa informed me that many years ago these species of Cassia were introduced there as coffee plants but soon found their way among the other weeds in the waste grounds.

The botany of the larger Keys was interesting because of the variety of the vegetation appearing in small circumscribed areas, and frequently each Key yielding species not observed upon the others. Lacking proper boat facilities, the only means of access to these coast islands, I depended upon the bateau for the near Keys and chance opportunities to reach the distant ones. To the North Key, one of the largest, most distant and interesting I was taken through the kindness of Capt. McIlvaine who was in search of floating timber; and during his day's work around the island, left me to the study of its vegetation which engaged my time both pleasantly and profitably. Among the more interesting finds here were *Maytenus phyllanthoides*, Benth., *Sapindus marginatus*, Willd., *Prunus Caroliniana*, Ait., *Forestiera porulosa?* Poir., *Passiflora suberosa*, L., *Psychotria undata*, Jacq., *Plumbago scandens*, L., *Ricina humilis*, L., *Sarcostemma crassifolium*, Decaisne, *Rhynchospora megalocarpa*, Gray, and *Stenotaphrum Americanum*, Schrank. To the citizens each Key is known by a specific name while the word Cedar distinguishes the group. This generic term led me to form a mental picture of islands covered with Cedar, but quite contrary to my expectation, the Cedar Wood,

Juniperus Virginiana, L., var. *Bermudiana*, Vasey, is actually scarce; perhaps a score of small straggling dwarfs comprise the entire living representatives of a past pencil-wood forest. Although the location of the Faber Pencil-mills, their wood is obtained chiefly, I was informed, from the banks of the Suwanee, a river twenty miles distant.

The town of Cedar Keys is divided equally between two adjacent Keys, the one sustained by its pencil and lumber mills, the other by its stores, hotels and transit depot. On Way Key, containing the business portion of the town, occurred such plants as *Erythrina herbacea*, L., ornamental with its handsome foliage and bright scarlet flowers, but an ungainly looking shrub in its naked attire of spiny twigs; the yellow flowered *Mentzelia Floridana*, Nutt., and the white blossomed *Bidens leucantha*, Willd., together luxuriating upon the dry shell mounds; the spiny shrubs of *Bumelia parvifolia*, DC., and *Lycium Carolinianum*, Michx., with the creeping *Iresine vermicularis*, Moquin, marking the limit of the tidal wave; while *Seymeria pectinata*, Pursh., *Ipomœa sinuata*, Ost., and *Euphorbia pilulifera*, L., were scarce and limited in their range; *Eustachys petræa*, Desv., with sometimes many spikes; *Cynodon Dactylon*, Pers., forming dense mats in the loose white sand; *Melica mutica*, Walt, appearing in the shaded nooks on the mounds; *Zamia integrifolia*, Willd., the Florida starch plant, with its red, novel cone-like aments just emerging from amidst its spreading fern-like leaves; *Carex leucorum*, Willd., var. *Floridanum*, with lenticlar achenia; *Rhynchosia minima*, DC., of green and variegated foliage; *Sageretia Michauxii*, Brongn., and *Opuntia Ficus-Indicus*, Haw.

Agreeable to the desire of a New York friend I engaged with him a small sloop for a few hours pleasure ride with the privilege of landing on Snake Key, an island several miles distant and so named because of the supposed abundance of snakes on it. Upon arrival we joined in crossing, with the direction to meet the boatman on the opposite side. We had just entered and the bright yellow flowers of *Helianthus præcox*, Gray & Eng., arrested my attention when my friend, a few paces in advance, leaped, yelled, and cried simultaneously "snake bitten." At first I felt concerned but soon comprehended the situation; he had strayed among a nest of Spanish Bayonets, *Yucca aloifolia*, L., most formidable growths with which to come in contact; and they appear too so plentifully along this coast. After culling specimens of *Physalis Pennsylvanica*, L., and *Phyllanthus Niruri*, L., the latter a low perennial of straggling frutescent appearance, we again entered our boat and continued sail.

Gainsville is located upon an elevated rolling country, extending south to Bronson where it abruptly terminates in a low flat pine country, continuing to the Gulf of Mexico, interspersed here and there with dense impenetrable jungles of vegetation, defining the low fertile hummock lands. It was on these high and dry sand-ridges that the empetraceous shrub *Ceratiola ericoides*, Michx., occurred so abundantly and seemed novel in its evergreen spheroidal forms, and the beautiful *Zamia* dotted the ground of the open upland pine forests with its green tufts of Cycas leaves, and later in the season the green leaves and white flowers of the *Calomba Caroliniana*, Gray, closely covered and hid to view the stagnant ponds around.

Near the Gulf the railroad passes for a distance of four miles through this dense vegetable growth of the Great Gulf Hummock, represented to be twenty miles long and half that width and penetrated by three large rivers conveying their waters to the Gulf. The promising appearance led me to extend my researches to these jungles. Notwithstanding a large portion of the time being consumed in reaching and returning daily from these somewhat distant grounds, I succeeded in two visits in enlarging my collection with specimens of such plants as *Chrysobalanus oblongifolius*, Mx., *Galactia Elliotti*, Nutt., *Sclerolepis verticillata*, Cavs., *Boltonia diffusa*, Ell., *Senecio lobatus*, Pers., *Vaccinium tenellum*, Ait., *Samolus ebracteatus*, Kunth., *Sabbatia gracilis*, Pursh., *Asclepias perennis*, Walt., *Ulmus alata*, Mx., *Sagittaria graminea*, Mx., *Spiranthes graminea*, Lindl., var. *Walteri*, Gray, *Calopogon multiflorus*, Lindl., *Smilax auriculata*, Walt., *Dich-*

ramena leucocephala, Mx., *Rhynchospora, macrostachya*, Torr., *Carex gigantea*, Rudge, *Cherokeensis*, Schk., and *verrucosa*, Ell., *Paspalum undulatum*, Poir., *Panicum? molle* Mx., and *gymnocarpum*, Ell., *Crataegus apiifolia*, Mx., and *Aspidium cristatum*, Swartz, var., *Floridanum*, with others previously detected.

Other plants seen growing sparingly upon the Keys were *Canavalia obtusifolia*, DC., *Rhizophora Mangle*, L., and *Laguncularia racemosa*, Gaertn., these with a few others mentioned find here perhaps their northern limit.

The arrangements completed, the present flora about exhausted, I was quite willing to depart southward in a small schooner beyond the distant highlands of Tampa to enter upon the study of a new field of nature's richest floral displays.—DR. A. P. GARBER.

NOTES ON THE HISTORY OF HELIANTHUS TUBEROSUS, THE SO-CALLED JERUSALEM ARTICHOKE; *by J. Hammond Trumbull and Asa Gray*, American Journal of Science and Arts, May, 1877.—We make the following extract: "Linnæus, in the Species Plantarum, gave to *Helianthus tuberosus* the 'habitat in Brasilia.' In his earlier *Hortus Cliffortianus* the habitat assigned was 'Canada.' M. Alphonse DeCandolle, in his *Géographie Botanique*, II., 824, (1855), refers to this as 'decidedly an error, at least as to Canada properly so-called," assigns good reasons for the opinion that it did not come from Brazil, nor from Peru (to which the name under which it appeared in cultivation in the Farnese garden seemed to refer), but in all probability from Mexico or the United States. He adds that Humboldt did not meet with it in any of the Spanish colonies.

About this time I received from my friend and correspondent, the late Dr. Short, of Kentucky, some long and narrow tubers of *Helianthus doronicoides*, Lam., with the statement that he and some of his neighbors found them good food for hogs, and, if I rightly remember, had planted them for that purpose. They were planted here in the Botanic Garden; after two or three years it was found that some of the tubers produced were thicker and shorter; some of these were cooked along with Jerusalem Artichokes, and found to resemble them in flavor, although coarser. Consequently, in the second edition of my *Manual of the Botany of the Northern United States* (1856), it is stated that *H. doronicoides* is most probably the original of *H. tuberosus*. This opinion was strengthened year after year by the behavior of the tubers, and by the close similarity of the herbage and flowers of the two plants, as they grew side by side; indeed, as the two patches were allowed to run together in a waste or neglected place, they have become in a measure confounded. Wishing to obtain an unmixed stock, I applied last autumn to Prof. J. M. Coulter, of Hanover, Indiana, and received from him a good number of tubers from wild plants of the neighborhood, which will now be grown. Some of these were slender, some thicker and shorter, and a few were to all appearance identical with Jerusalem artichokes. If they were really all from one stock, as there is reason to believe, the question of the origin of *Helianthus tuberosus* is well nigh settled.

ADDITIONS TO THE FLORA OF IOWA.—Since my last report, I find the following rare plants, to be added to Arthur's Catalogue of Iowa Plants, discovered in mounting my collection:

Euphorbia obtusata, Parsh., Prof. F. L. Harvey, 1875, Des Moines river banks near Humboldt.

Habenaria obtusata, Lindl., Mrs. J. McNeil, 1875, abundant in Harrison Co., Iowa, groves.

Desmodium paucifloruni, DC., Groves, Ames, 1876.

Hypericum nudiflorum, Michx. Brink of Cedar River, five miles above Cedar Rapids, June 26, 1876.

Cymopterus glomeratus, Prof. F. L. Harvey, 1875, Humboldt, Ia. A rare plant here.

Setaria Italica, Kunth., College Farm, Ames, 1876.

Setaria verticillata, Beauv. College farm, large as millet!

Panicum depauperatum, Muhl. Woodbine to Ames.

Lolium perenne, L., Ames, dooryards, to Denison.

Poa alsodes, Gray, Woodbine 1875, Humboldt, Prof. F. L. Harvey, 1875.

Eragrostis Purshii, Schred. Woodbine, 1875.

Festuca elatior L. Near Ames, 1876.

VARIATIONS.—The normal *Erythronium albidum* from Illinois to W. Iowa, noted for spotted, broad leaves and very recurved petals, confined to groves; while a much smaller form from W. Iowa to Kansas, confined to the *prairies*, has narrow leaves, *never* spotted, petals *never recurved*, not half the height of the former. The difference is doubtless due to soil and locality.

As far as known to me, I was the first to discover this form; while the value and beauty of the *two* forms must be seen as they grow, (not in *hortis siccis*,) to be appreciated.

A still more noted variation is the *two* forms of *Cypripedium candidum*, the larger belonging exclusively to the Missouri "slope," W. Iowa, and at an invariable elevation of 100 feet above Boyer Valley (where it abounds,) on the steep, *loose* soil of the Sandy bluffs, no doubt to retain its original elevations here, and to the very verge of the "Divide," when we enter a new kingdom as to soil, air and flora! I never saw the smaller form till coming here, nor does it occur within 60 miles of the larger, the latter beginning at Woodbine, Harrison county, the former (as you advance eastward) at Carroll, Carroll county. The larger form seems more properly allied to *C. spectabile* than to *C. candidum*, and the two look like giant and pigmy side by side in a Herbarium.

Still much the same is true of the size of leaves in the eastern and western Iowa forms of *Lobelia spicata*.

Apropos of the surprising crop of *Valeriana sylvatica* appearing one year and all gone the next. In 1869 I saw a slough six rods or more long by 25 feet wide *covered all over in one mass of white bloom, like snow*, with our common *Ranunculus aquatilis*, while not *one* plant has appeared since, and I had to wait for seven years and go 212 miles to find a specimen, in Cedar River, 1876. R. BURGESS, *Ames, Iowa*.

SOME HARDY DENTARIAS.—About the middle of this month, as I was botanizing in the woods I found many small patches of *Dentaria laciniata* in bloom. It was early in the morning, and almost everything was covered with hoar frost. This was the case with Dentaria. In most all of the patches, however, there were one or two plants not touched by the frost. While many were black and cracked between the fingers, a few retained their freshness, notwithstanding they were sometimes entirely surrounded by the others. Darwin in his "Variation of Animals and Plants," mentions this fact in regard to peas growing in his garden, and thinks that there is a difference in the constitution of individual plants, so that some are better able to withstand the frost than others. As the Dentarias referred to were all equally exposed and growing close together, the fact of some being frosted while others were not, cannot be explained by saying there was a difference in soil or exposure. Darwin's explanation is a good one and no doubt correct. The fact is certainly a curious one.—JOSEPH F. JAMES, *Cincinnati, Ohio*.

SOME KANSAS PLANTS.—On page 10, Vol. I, No. 3, of the BOT. BULLETIN, G. C. Broadhead says of *Œnothera speciosa:* "It generally prefers a rich limestone soil of but a few inches thickness, resting on limestone." I have found just the reverse to be the case here, as it is quite common on the river bottoms where the soil is rich and deep, but I have never found it on the limestone bluffs where the soil is such as Mr. Broadhead describes; while *Œnothera Missouriensis* is abundant in such situations and avoids the bottom lands.

I found *Clematis ochroleuca*, Ait., in bloom April 28th, on the highlands between the Solomon and Republican rivers, Cloud county. I see Gray's Manual says it is rare,

and found near Brooklyn, N. Y., Pennsylvania and Virginia. I thought perhaps it might interest your readers to hear of it so far west as this Will some of your readers tell me how to preserve herbarium specimens of Cacti?—MATTHEW H. PANTON, *Junction City, Kansas.*

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, April. The Dictionnaire de Botanique, by M. H. Baillon, Paris, is in a fair way to become a bulky work. The third fascicle is now out and about 300 pages will be devoted to the first letter of the Alphabet. The Cretaceous deposits of Spitzbergen have yielded *Taxodium, Sequoia, Cyperus, Carex, Alisma*, seven Poplars, two Alders, three Hazels, a Hornbeam, a Beech, four Oaks, an Elm, a Plane-tree, an Ivy, five species of *Cornus*, two of *Nyssa*, two of *Magnolia*, a *Tilia*, three Maples, three Hawthorns, and a veritable fossil strawbery! It seems that the American Mistletoe is making great ravages among the elm and black walnut trees in the latitude of Louisville, Ky. "As soon as a bunch of mistletoe fixes itself upon a branch, the outward extremity ceases to grow, and finally dies. The tree soon presents a clubby appearance, followed by death." The mistletoe grows in great abundance about Hanover, Indiana (forty miles from Louisville), but we have never appreciated that it was such a dangerous customer. It grows on the elm, walnut, honey-locust and various other trees, but we have yet to notice the first deadening effects. We are glad to have our attention called to it and will watch it more closely.

American Naturalist, April.—We quote: "Fournier gives as the result of his study of the grasses of Mexico the following statement: 'Among grasses with separated sexes, the female flowers differ very little, if at all, as regards the situation or form of the floral envelopes, when the sexes are borne on different plants; but when the plant is monœcious the glumes of the two sexes are widely different. These differences are most marked in certain genera of Chlorideæ, normally diœcious and accidentally monœcious.' The grass described by Engelmann under the name *Buchloe dactyloides* is a curious example in point. Beside this is now placed *Opizia stolonifera*, of which Presl had seen only the female plant. Although the female flowers of these plants differ very widely, their male plants resemble each other so much that they have been put in the same genus. *Casiostega humilis* is the male form of *Buchloe*, and *C. anomala* is the male form of *Opizia*." From the Flora of Colorado we quote the following sentence in regard to *Buchloe* as being of interest in this connection: "Nuttall, who had only the male plant, referred it to the genus *Sesleria*, and described it as *S. dactyloides* (*Gen.* 1. *p.* 64.) Steudel founded another genus on the female plant, *Antephora axilliflora*, (*Glum.* 1. *p.* 111). The true relationship between them was first detected by Dr. Engelmann, and clearly set forth by him in his masterly article in the *Trans. St. Louis Acad.*"

The Gardener's Monthly, April.—An article on "Self-Fertilization and Cross-Fertilization of Flowers," is begun by Mr. Meehan in this number.

Bulletin of the Torrey Botanical Club, March and April.—Francis Wolle adds one hundred species to the Fresh Water Algæ of our country, and C. F. Austin describes several new species of Mosses.

Field and Forest, April.—Mr. Martindale gives an interesting little note in regard to the Scandinavian herbarium which he purchased at the Centennial. He says that it contains about 1500 species and is probably one of the most complete representations of the flora of Sweden to be found in this country. He mentions two or three points of interest in comparison with our own flora. Sweden has 30 species of *Hieracium*, but only one *Aster* and one *Solidago!*

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VARIATIONS IN PODOPHYLLUM PELTATUM, LINN.—

In a copse of 2 to 3 acres in extent, situated on the southern slope of Chestnut Hill, not quite half a mile north of Lafayette College, Easton, Penn., the plant grows in great abundance, and here, about 6 or 7 years ago, my attention was arrested by the appearance of several singular forms. These, reproduced, as they have been, every year since, seem to me worthy of record, and the rough drawings here given are sufficiently accurate to show the aberration from the prevailing type. Nothing of the kind ever fell under my notice before, but Mr. W. M. Canby informs me that he has found No. 4 or 5, or both, near Wilmington, Del., and all of them, and perhaps still other variations, are likely to be discovered elsewhere, if search be made.

No. 1 represents the common flowerless stem (never so tall as that of No. 2) arising from the rhizoma (r) and crowned by its umbrella-shaped, equally-peltate leaf.

No. 2 is the common flowering stem, divided above and bearing on each branch an unequally-peltate leaf, with the single flower in the fork on a peduncle from 1 to 2 inches long.

No. 3 is the same, except that the peduncle is borne on one of the branches 2 or more inches above the fork.

No. 4 is twice forked and has 3 leaves, with the flower borne in the fork between the upper leaves.

No. 5 is the same, except that the peduncle arises from one of the branches 2 or more inches above the upper fork.

No. 6 is like No. 2, but one branch is shorter and more slender, leaving a much smaller leaf which is only 3-lobed, evidently a transitional state between No. 2 and the next.

No. 7 is No. 2 with one of the branches wholly suppressed, the remaining branch assuming an erect position. This is the most common of the aberrant forms and is more abundant than ever this year.

No. 8 is No. 2 with both branches suppressed. It might pass for a scape, were not the stem just as thick and the peduncle as slender as usual.

No. 4 and 5 furnish good and well marked examples of acceleration in development, and Nos. 6, 7 and 8, of retardation, both occurring in the same species and in the same place.

In the last edition of his Manual, Dr. Gray states that *Podophyllum peltatum* has been found with *several carpels*, instead of *one*, and I may add that two such instances have fallen under my observation.—Thos. C. Porter, *Easton, Penn.*

Some Notes on Nepeta Glechoma and Other Plants.—I have just returned from a second short visit to Pulaski Co., Virginia. *Halesia tetraptera* was just coming into bloom (April 26), *Draba verna* fully expanded, and *Sedum Nevii* not yet in flower.

In Pulaski, Draper's Valley, I again examined *Nepeta* (May 18) The plants *with* crosses have increased in numbers, speading up the hill from the spot where they were at first confined to a space of a few yards. I send you the following measurements:

	With Crosses.	Without Crosses.
Greatest *width* of flower	7-16	4-16
Extreme length of flower	14-16	6-16 to 8-16
Extreme length of calyx	4-16	3-16
Size of crosses, *i.e.* length of arms	1-32	

Clear length of the corolla.

14-16 { Tube 9-16 { 5-16 End of Tube to dilatation. / 4-16 Dilated part of tube. } / Lobes 5-16 }

Larger flower *with* crosses.—Corolla tube much dilated, hairy, mottled with purple spots, imitating very much *Physostegia Virginiana*; throat (lower lobe of corolla) beset with thick white hairs or glands 1-16 inch in length; stem square, the edges bristly downwards. Calyx 16-ribbed, bristly. Pistil *closely set in* the groove of the upper lip. Upper anthers (cross) just below summit of upper lobe, say 1-32 inch below; lower anthers (cross) white or *reddish!*, just at summit of undivided tube, *i. e.* at base of upper lobe. 1-16 inch *of flower exserted* from calyx.

Color pink, or light-reddish purple.

Smaller flower *without* crosses.—Corolla tube slightly, if at all, dilated, closely hairy with small hairs.

Hairs delicate, 1-32 inch in length.

Bifurcated pistil *sheering off from* upper lip of corolla. Upper anthers (no cross) below the top of undivided tube, lower ones 1-32 inch below the upper.

Corolla and calyx together less than 8-16 inch.

Color dark-*bluish* purple, or rather purplish *blue*, often called by persons a *blue* flower.

Both plants were maturing from one to four seeds; one seed, frequently, much larger than the others. At Mr. Draper's the two plants were at times intermingled, but

always easily distinguished. In the old garden, a hundred yards from the spring, I found a sort of hybrid, larger flowers than *Nepeta Shriveri* of Wythe Co., and apparently abortive efforts to make bad crosses. But in all other localities (except Mr. Draper's yard) the Wythe County type is through the year scrupulously adherent to its character in respect to having flowers *half the size, dark purplish blue* color, *never a cross*, inconspicuous and *widely separated* or no anthers; which I have nothing more to say of than that I shall for the present claim the variety, reverting to the opinion of Prof. Wood some twenty years ago, that the decided and invariable absence of crosses indicated a new flower. No one who compares the two flowers will fail to see the resemblance and the distinctness. I wish those Hyperborean Botanists would designate their chameleon *Nepeta, sportivus* instead of *Glechoma*; and our Wythe plant, Old Ironsides, as its face is as unchangeable as the laws of the Medes and Persians.

I have found a fourth plant of *Hydrastis*, so they belong to our Flora, though I fear they are very recently naturalized.

About three years ago, I detected a dissepiment of *Draba verna*. Next spring at the same spot I collected nice specimens from an area of a few yards. This spring the woods was carpeted in every direction and the plant appeared on the top of Piney Ridge, about Boyd's Depot, at Rich's Mill, on Caldwell's Hill, and, for aught I know, elsewhere. Mr. Forney's eye never detected it, though he was used to it in North Carolina, and had searched over all these grounds. It is my impression that these sixty-five millions—or more—plants came from that small beginning. I regret to say that the same may be predicated of *Andropogon*, which is marching upon us from Tennessee or the West, and raising its plumes to the dismay of many a farmer. I found *Cedronella cordata* in Pulaski County (Rich Hill) during my last visit, making the third spot in which I have seen it. *Uvularia grandiflora* exists, along with *U. perfoliata* in greatly varied luxuriance, around Wytheville as well as in Pulaski County.—Howard Shriver, *Wytheville, Va.*

Iris.—Sereno Watson calls the attention of all botanists during this season to the various species of *Iris*, and specimens of flowers, fruit and roots, fresh or dried, from any part of the country, may be sent to the Botanic Garden, Cambridge, and will be of service. The eastern species of the genus need a thorough revision and all botanists should contribute whatever information they can obtain so that the revision can be made thorough and decisive.—J. M. C.

Recent Publications.—*Algæ Exsiccatæ Americæ Borealis: curantibus W. G. Farlow, C. L. Anderson, D. C. Eaton editæ. Fasc. I.* Under this title is published a set of 50 authentically named North American Seaweeds, many of them rare species from the California collections of Dr. Anderson, and the Key-West collections of Mr. Hooper. Other fasciculi are to follow, until the greater part of our marine Algæ are thus distributed. The edition consists of only thirty copies, of which only ten are for sale. The present selection is made up of red and green seaweeds, in small quarto sheets, and its price is $8. The black and olive-colored Algæ will be on folio paper, and the price will be $12. Address Prof. Wm. G. Farlow, Harvard University, Cambridge, Mass.

Botanical Contributions, by Asa Gray. *Characters of some little-known or new genera of plants from the Proc. Amer. Acad. Vol. XII., issued, May*, 1877.—Dr. Gray, after having examined for the first time the flowers of *Canotia holacantha* Torr., has placed it in the family of *Rutaceæ*, owing to the structure of the disk, or gynobase. Bentham and Hooker had included it among *Rosaceæ*, and afterwards Baillon put it among the *Celastraceæ*. The plant is from Arizona and is one of the four "spartioid green barked and mainly leafless shrubs" in that dry region; "*Thamnosma montanum*,

Torr., which is a genuine *Rutaceæ*; *Holacantha Emoryi*, Gray, an undoubted *Simarubaceæ*; *Koberlinia spinosa*, Zucc., which has been referred to the same order, but is more anomalous; and finally *Canotia holacantha*, which, if I mistake not, must take its place among the typical *Rutaceæ*, notwithstanding some anomalies."

A new genus of the *Loasaceæ*, from Lower California, is described and is called *Sympetaleia* from its most striking and anomalous character of a truly gamopetalous corolla! In *Eucnide* the petals are united at the very base into a ring, but in this new genus they form a long tube even to the base of the spreading limb. A new genus of the *Hydrophyllaceæ* is described and dedicated to Mr. J. G. Lemmon an ardent and successful explorer of the Sierra Nevada region. *Lemmonia Californica* is the name of genus and species, somewhat related to the *Phacelieæ*, but belonging properly to the *Nameæ*. *Echinospermum Greenei* is described and forms an additional link between *Echinospermum* and *Eritrichium*. The genera *Echidiocarya* Gray, and *Leptoglossis*, Benth., are each described with two species.

American Journal of Science and Arts, June.—Dr. Gray gives a review of the "Organogeny of the Female Flower of *Gnetum Gnemon*," by O. Beccari, being extracted from the Italian Botanical Journal of January, 1877. It is a disputed point whether the *Gnetaceæ* should rank with the Gymnosperms or not. There seems to be an obvious and real transition from the *Gnetaceæ* to Angiospermous Dicotyledons.

The death of Alexander Braun, a distinguished German systematic botanist, is announced, and a short account of his life and labors given. He was born at Ratisbon, May 10, 1805, and died at Berlin, March 20, 1877. He seems to have been one of the few systematic botanists left to Germany, all the distinguished botanists of the present day having turned their attention to histology. A. Braun, Carl Schimper, Agassiz, and Engelmann were all together at the University of Heidelberg fifty years ago. The last named is the only survivor. Braun's *forte* was morphology. His first important contribution to science was a memoir on the arrangement of the scales of pine cones, published in 1830. "With this publication began the present knowledge of phyllotaxis. His work upon *Marsilia*, *Pilularia* and *Isoetes* may be essentially complete. But his prolonged studies of *Chara*, which began forty years ago, and the completion of which would have crowned his career, have probably not been finished, or brought into such form that results may be fully secured.

American Naturalist, June.—Mr. W. J. Hoffman, M. D., contributes an interesting paper on "The Distribution of Vegetation in Portions of Nevada and Arizona." He divides the Flora into four classes; I. the flora of the mountains, II. the flora of the foot-hills, III. the flora of the plains, IV. the flora of the salt marshes. A short table is given showing the elevation, timber line, latitude of several mountains and the elevation of the nearest plains. An interesting abstract of Professor Morren's communication to the Royal Academy of Belgium, on "Vegetable Digestion," is given by Byron D. Halsted. Two interesting experiments, made by Professor Sachs upon the porosity of wood, are noted.

NOTHOLAENA DEALBATA.—We have just received from James Wilson, Esq., of Arkansas City, Cowley Co., Kansas, some good specimens of this rare and highly prized fern. Mr. Wilson says that he has just found it in great quantity and will take pleasure in supplying any of our readers with specimens next autumn, when the fronds are in fruit. At present he finds on many of the tufts three kinds of fronds; the dead ones and the almost perfect ones of last year, with the tender little half-grown fronds of this season.—J. M. C.

NOTES.—This spring, while collecting *Stylophorum diphyllum*, Nutt., I noticed a flower with only *two* petals. As the petals are very fugacious, I supposed, at first, that

two had fallen, but close examination showed that two were all the corolla ever had. Three of the normal four were united into *one* and the lines of coalescence were distinctly visible. The fourth petal occupied its natural position. It is quite common to find this plant with three leaves; indeed, it is more plentiful than the two-leaved form.

A very large form of *Orchis stricta*, L. grows at Chain Mill Fall, near Hanover The plants are about a foot and a half high and *very* leafy and branching. The leaflets are fully an inch broad and each one is margined with dark purple. The corolla, instead of being "small" is an inch broad and the base of the limb is penciled with purple lines! The whole plant is clothed with long, soft hairs, villous-pubescent.

Jefferson County has been mentioned before as growing some large weeds in the Composite line and we come with another confirmation of its ability in this direction. While taking a walk last winter I noticed a *Vernonia* (*V. fasciculata*, Mx.) that seemed to be very full of heads. Curiosity getting the better of me, I resolved to count them. At the end of three quarters of an hour, I had broken off the last one, the whole number of *heads* being 3290!

Taking an average of 20 flowers to the head (as they would easily reach that number) we would have 65800 flowers produced by a single plant. Suppose that only one-half of the akenes came to perfection and one-tenth of these were carried to suitable conditions for growth, what an immense power of propagation did this one specimen possess. The plant was only 8 feet high, and 5¾ inches in circumference at the ground.

As far as I know, Trimble Co., Kentucky, has furnished the champion *Arisæma* (*A. triphyllum*, Torr.). I give some of the measurements.—

Height 30 inches; Leaflets, 10 inches long by 9½ broad; Spadix, 2½ inches long; Spathe, 4 inches long; Diameter at base of the stalk 1½inches; Corm 7½ inches in circumference. Can any one tell us of a larger one?

C. R. Barnes, *Madison, Ind.*

Cross-Fertilization of Aristolochia.—Mr. H. G. Hubbard, now traveling in Jamaica, has communicated to a western newspaper some interesting notes on the natural history of the island. His observations on *Aristolochia* are fully confirmatory of the studies of others in the case of *Aristolochia clematitis*. "I have had an opportunity of examining the flowers of *Aristolochia grandiflora*, the 'Dutchman's pipe,' called here the 'John Crow,' or 'carrion flower,' from the putrid stench which it exhales. This flower is one of the largest known. The tube or bowl, about a foot long as it hangs from the vines, makes a very good imitation of the Dutchman's china pipe, but the mouth of the bowl turns forward and expands eight or ten inches in diameter, and from the lower edge of this dangles a slender tail, about a foot long. The whole flower is spotted green and purple, like a diseased liver. Notwithstanding its vile odor and uncanny look, it is the most interesting of flowers. The tube is divided into three chambers by constrictions and valves furnished with backward-pointing bristles, the whole forming a trebly guarded fly-trap. The outer chamber alone gives out the carrion odor, attracted by which, insects enter, and finding themselves deceived try to escape, but the long recurved bristles,which line the walls, entangle them when they turn back, but favor their progress through the second trap and into the second chamber beyond. Finally they find their way through the third and last trap, into the third chamber. And here you will find small flies and beetles by dozens, if you open the blooming flowers. Now what is the object of this evident contrivance? The flower is not insectivorous. The entrapped insects are always found alive and in good condition, no dead ones in any of the chambers. In fact, the last one, which they must eventually reach, and which also contains the floral organs, seems to have been especially contrived for their comfort and convenience. It is spacious, unencumbered with bristles,

except just about the entrance, where a perfect forest of them renders escape into the preceding chamber impossible, and moreover about the floral organs an abundance of nectar supplies them with food. There is a fine stumbling-block in the way of the believer in the laws of cross fertilization. As Professor Gray would say, this plant seems to be formed on the plan of 'how not to do it.' Skeptics have pointed triumphantly to the *Aristolochia* as a plant which, with the utmost ingenuity, has provided for insuring self or close fertilization. They had opened flowers in full bloom, found the anthers pouring forth pollen, and the imprisoned insects skipping about the inner chamber completely dusting themselves and its walls with the yellow grains. The stigmatic surface, too, had long been fertilized, its lobes had closed, and having performed its office the pistil was withering away. The fact of self-fertilization in this plant seemed proved. Nature, however, does not disclose all her secrets on the first inspection, and a more careful study of this flower in all its stages will show that its wonderful machinery is contrived solely for securing cross-fertilization through the agency of insects, and that it cannot fertilize itself. In fact the anthers and stigma in any flower *are never open at the same time*. The mystery is explained when we examine the flowers that have blossomed and are withering: *the trap is open and the insects all flown*. Each of the three constrictions, which were at first so narrow as only to admit of a small insect pushing its way between the hairs, is now gaping widely open, and all the bristles so wilted and flaccid as to offer no impediment to their escape. Now turning to a bud just bursting into flower, we find the bristles rigid and the trap set. The stigma is now widely open and ready to receive pollen, but the anthers tightly closed and their pollen quite green. Each flower has then a double duty to perform; first, to catch insects which have been liberated by some flower previously in bloom, and to effect its fertilization with the pollen which they bring; second, to feed and hold them there until its stigma has closed and its anthers burst. And, finally, it opens its trap and sends them forth with unimpaired vigor and a fresh load of pollen for the next flower that blooms."—AMERICAN NATURALIST, *May*.

BOTANICAL NOMENCLATURE.—There are two questions sometimes agitated with respect to the naming of plants. One is, as to the manner of writing specific names, the other, as to the kind of names to be given. The writer would heartily endorse the general custom of botanists with regard to the first question, and would deprecate their custom with regard to the second. Some botanists, after the manner of zoologists, make all their specific names begin with a small letter. Whether a species is named for a man, country, or any thing else with a proper name it must begin with a small letter, thus destroying every remnant of resemblance it might have borne to the original name. On what grounds such a rule was made, it would be hard to say. The rules of language are very plain on such a point and they should not be violated for trivial reasons. It is to the credit of botanists in general that they have not yet adopted this innovation which makes science ungrammatical. But in regard to the second point. Can we not have a little relief from the proper names that in most unstinted lavishness are applied to species? What is the use of them, or what do they mean? If a country is to be honored by a botanical name, let it be honored *once* and then let it retire, but the endless processions of *Canadensis*, *Caroliniana*, *Virginiana*, etc., are a little monotonous, to say the least of it, especially when the names are not always suitable. Such names may commemorate the place from whence the first specimens were obtained for description, but what peculiar appropriateness have they after further discovery. This is the very difficulty of naming a species from any locality. While such a name may be suitable for a time, further discoveries may prove the plant to be of very wide range and may often find it in greater abundance than at the first published locality. But the names of persons are used just as lavishly. It is extremely suitable to dedicate one species or two to diligent

workers in botany, and a genus to the masters, but to have one man's name appended to twenty or thirty species, however distinguished he may be as a collector, gets to be amusing. And to dedicate a beautiful plant to Tom, Dick or Harry, simply because he happens to find a new species, does not tend to make botanical names a special honor to those who deserve them. Just read over the names of new species described by the masters for the past few years. It will be largely a list of proper names. The unfortunate part of it is, that the leaders in botany are helpless in the matter. They must have the plants to describe, must keep on the good side of their diligent correspondents, but they can never do this without naming every other species after the collector. A man will risk breaking his neck for a plant that may bear his name when it comes to be described. Collectors should be more modest in their claims and be content with one or two species, allowing the rest they discover to be named something that will give some idea of the plant. Surely something descriptive of the species can always be found and used for the specific name. Of course, by descriptive names are not meant such as have delighted our eyes in the last few numbers of the American Journal of Science and Arts, where sesquipedalian words, made up of names of elements and half the letters of the Greek alphabet, and stretching clear across a broad page, describe some obscure chemical compound that the weight of such a name could grind to powder. Nor do we want such names as that poor little new double white Violet bears among gardners, namely, *Viola odorata alba fragrantissima plena*. But some simple descriptive adjective added to the generic name would mean something to every one and would always be applicable.—N.

A Kansas Clematis.—In the June number of the Gazette, Mr. Matthew H. Panton, of Junction City, says he found *Clematis ochroleuca* in Cloud county. In 1874, Louis Watson, M. D., of Ellis, Kansas, sent me a *Clematis* which I called *C. ochroleuca*, as it agreed better with the description under that name than with any other which I had. I learned, however, from Dr. Watson that it was not *C. ochroleuca*, but *C. Fremontii*. In "Contributions to American Botany, by Sereno Watson, issued April, 1875," is the following description of *C. Fremontii* as a new plant:

"Stem stout, erect, clustered, 6–12 inches high, leafy and usually branched, more or less villous-tomentose, especially at the nodes; leaves simple, 3–4 pairs, coriaceous and with the veinlets conspicuously reticulated, sparingly villous, sessile, broadly ovate, entire or few-toothed, 2–4 inches long; flowers terminal, nodding, the thick purple sepals an inch long, narrowly lanceolate, tomentose upon the margin, recurved at the tip, the peduncles becoming erect in fruit; akenes silky, 3–4 lines long, the tails less than an inch long, naked above, silky at base. This well marked species, the western representative of *C. ochroleuca*, was first collected by Fremont (n. 194) on his second expedition, but without note of the locality. It was re-discovered during the past season by Louis Watson, M. D., in the neighborhood of Ellis, Kansas."

This is probably what Mr. Panton has found.—J. H. Carruth, *Lawrence, Kansas, June 19th*, 1877.

Some Botanical Notes from Kansas.—The spring season in Central Kansas opens very irregularly. I have seen the prairies covered with the white and blue blossoms of *Anemone Caroliniana*, large patches of *Androsace occidentalis*, and *Draba Caroliniana*, as early as the 3d or 4th of April, and I once gathered a peculiar form of *Erythronium albidum*, March 27th, having narrow leaves, neither spotted nor blotched, their petioles a reddish color, the sepals neither reflexed nor spreading, but each having a bright yellow spot at the base inside. In other years I have found nearly all of the above making their first appearance about three weeks or a month later. In April, *Anemone Caroliniana* is the most conspicuous and abundant of our prairie flowers, appearing almost as soon as the frost is out of the ground, and is closely followed by

Lithospermum longiflorum, *L. hirtum*, *Astragalus caryocarpus*, *Oxytropis Lamberti*, *Psoralea esculenta*, *Ceanothus Americanus*, *Houstonia angustifolia*, *Comandra umbellata*, *Baptisia australis*, and *B. leucophæa*. The Dandelion of the East is compensated for by *Troximon cuspidatum*. Early in June the prairies are covered with *Psoralea argophylla*, *Pentstemon Digitalis*, *P. pubescens*, *P. grandiflorus*; while the rocky sides and edges of the bluffs are made beautiful by the large blossoms of *Œnothera Missouriensis*, *Œ. serrulata* and the fragrant pink blossoms of the sensitive plant, *Schrankia uncinata*. The river bottoms are richly clothed with the large white flowers of *Œnothera speciosa*, the yellow *Œ. serrulata* and *Œ. sinuata*, the bright blue *Tradescantia Virginica*, the white *Callirrhoe alceoides*, and a *Callirrhoe* which I cannot name, with prostrate stems and almost blood-red flowers, growing in patches, *Delphinium azureum* with white flowers, and later, about the beginning of July, *Argemone Mexicana* with large white flowers two inches across. One coming from northern Illinois or Iowa would be much disappointed with the herbal flora of our woodlands. It would be vain to look for the different species of *Dicentra*, *Aquilegia*, *Claytonia*, *Castilleia*, *Collinsia*, *Hydrophyllum*, *Trillium*, etc., for we have none of those. Their place is poorly supplied by *Ellisia Nyctelea*, *Viola cucullata*, *Ranunculus abortivus*, *Oxybaphus nyctagineus* and *Campanula Americana*. Although this has been called a treeless country, we have a pretty fair variety of forest trees mostly confined to the streams, some of which I will mention. They are *Salix nigra*, *Populus monilifera*, *Gleditschia triacanthos*, *Gymnocladus Canadensis*, *Tilia Americana*, *Cercis Canadensis*, *Juglans nigra*, *Carya amara*, *Platanus occidentalis*, *Ulmus fulva*, *Ulmus Americana*, *Celtis occidentalis*, *Quercus macrocarpa*, *Quercus prinoides*, *Fraxinus Americana*, *Negundo aceroides*. The undergrowth is mostly composed of *Cornus stolonifera* and *Symphoricarpus vulgaris*.—MATTHEW H. PANTON, *Junction City, Kansas.*

In the last Naturalists' Advertiser is the prospectus of an important work on Ferns. S. E. Cassino is about to publish, in parts, a work on ferns, the text by Prof. D. C. Eaton, and illustrations by Mr. James H. Emerton. The great cost of suitable plates has, until now, hindered publishers from so large an undertaking, but Mr. Cassino has greater faith in the botanical public, and proposes to make the attempt. The parts will be sold at $1.00 each, and will appear at intervals of about three months. Each part will contain three elegant quarto plates, colored, and in the course of the publication every species known to inhabit the United States will be figured. We hope that Mr. Cassino will be encouraged in this undertaking by all botanists, for the work is a good one, and the parts are surely very cheap.

All communications should be addressed to

John M. Coulter, Hanover, Ind.,

or, M. S. Coulter, Logansport, Ind.

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PINUS SEROTINÆ, or, Pines, the cones of which open *late*, often long after maturity. Michaux was the first to notice that the cones of a certain pine of the South Eastern States "arrive at maturity the second year, but do not release their seeds before the third or fourth," and he therefore named it *P. serotina*. It is now thought that this tree is scarcely distinct from the northern *P. rigida*, and I have seen specimens of the latter in which, also, some cones remained thus closed after maturity. The same fact has been observed by Dr. Chapman in a pine of Apalachicola, which he doubtfully referred to *P. inops*. Though its much more slender and delicate leaves also distinguish it from true *P. inops*, every other character is the same as in that species, so that we are justified in introducing it as *P. inops*, var. *clausa*, Chapman.

Here, then, we have two northern pines, southern forms of which show this "serotine" character. But it seems not generally known that quite a number of Western and of Mexican pines also often open the scales of their cones long after maturity or, sometimes, never. Those of our flora are *P. contorta* (with *P. Murrayana*, *P. Bolanderi*, etc.), *P. muricata* (*Edgariana*), *P. tuberculata* and above all *P. insignis* (*radiata*, *Monteragensis*, etc.).

The following important biological questions remain as yet unanswered, waiting for the patient investigation of students, who live in the countries where these trees grow:

1. Do the cones of these species never open as soon as ripe, but always remain closed until some time, a year or years, after maturity?

2. Do some cones open when ripe, and others of the same tree years later, and some never?

3. Does season, locality or individual character of the trees have any influence on this peculiarity?

4. At what season do the late cones open, under what physical conditions, and what is the cause of any of them remaining closed forever?

5. How many years do the seeds of such closed cones retain their vitality, and is it possible, that the seeds may germinate after the cones have fallen to the ground and rotted?

The supposition that the closed cones were sterile or contained too few seeds, did not prove correct; it seems that all cones of the several species in question contain comparatively few seeds; the seeds of closed cones, many years old, proved perfectly sweet and therefore probably sound.—G. E.

SISYRINCHIUM ARIZONICUM, *Rothrock.*—1–2 feet high; stem proper smooth, ancipital; leaves 6–12 inches long, 2–6 lines wide, gradually attenuate into an acute point, 2–4 distinct white ribs in center, and one or more less distinct toward either margin, minutely pruinose glandular, slightly roughened on the margin; spathe of two lanceolate leaves regularly tapering to the top, somewhat shorter than the peduncles of which each branch bears from 2–5 (most frequently 2); flowers yellow 1½–2 inches in diameter, bright yellow segments of the perianth broadly lanceolate; anthers 6 lines long, linear, twice as long as the dilated filaments which are united about one-third their length; style cleft half way down into linear divisions; seeds (*immature*) oval or nearly round, margined on a funiculus longer than their diameter.

This handsome species I discovered at Willow Spring, Arizona, in 1874, at an altitude of 7195 feet, in damp places, among the oak woods, (No. 238.) It will be fig. 26 of my forthcoming report.—J. T. Rothrock.

Chimaja.—A well known plant in New Mexico, where it is used to flavor roast meats, to make bitters, and as a warming stomachic, proves to be an old species, i. e. *Cymopterus Fendleri*, Gray.

It (the root) has a most pleasant anisate odor when fresh and also when cooked. What invests the plant with a special interest is the fact that its local repute has induced certain parties to propose it as the basis of another new quack medicine. It is probably of not more value than sundry other species of the order.—J. T. Rothrock.

Some Oregon Gramineæ.—In the Centennial exhibit of Oregon, at Philadelphia, was a collection of native grasses in bundles or sheaves, intended to show the grazing capacity of that State. I was much interested in these grasses and secured a quantity for specimens. They consisted of 10 or 12 species, of which the following named ones presented some features of interest:

Agrostis microphylla, Steud. This is called Wild Red-top, grows on bottom lands, and averages 4 feet in height. This is considered by Prof. Thurber to be one of the forms of *Agrostis exarata*, Trin. It is the form with awned flowers, and differs widely from the *A. exarata* figured in Trinius' Species Graminum, Vol. 1, fig. 27, which is unawned, slender, and with an open spreading panicle. The *A. microphylla* is a strong upright grower, with a rather narrow but dense panicle, which is 6 to 10 inches long, the branches very numerous at each joint, mostly short but of unequal length, and rather appresssed at the axis.

There were two sheaves under the name of Wild Rye grass, one of which was the *Elymus condensatus*, Presl., growing from 5 to 8 feet high, said to be very nutritious but too coarse for usual feed. The other was a much more slender grass of about 3 feet in height, the spike much resembling a *Triticum*; in fact, it seems to unite *Elymus* with *Triticum*. It is not a dwarf *E. condensatus*, for the joints of the spike are more distant, and instead of giving out 5 or 6 spikelets, there are never more than two, and in many cases the upper joints have only one spikelet. It answers to herbarium specimens labeled *Elymus triticoides*, Nutt., and I suppose it to be that plant. Apparently the same plant is in the collection of Xantus, from Lower California, as *Triticum repens*, with which it is probably often confounded.

Another sheaf was called Wild Fescue grass, from Eastern Oregon, "growing from 10 inches to 1½ feet high, full of seeds and very nutritious." This is probably the *Ceratochloa* (*Bromus*) *breviaristata* of Hooker, though smaller than his figure in Fl. Bor. Am. It is likewise the same as is collected in the mountains of Nevada, Wyoming, Utah and Colorado, and called *B. breviaristatus*, and I hardly see how it can be separated from the *B. unioloides* of Texas and Arizona. It seems to vary much in consequence of altitude, soil and climate. The awn in the Oregon specimens is very short, perhaps one-fifth the length of the lower palet, answering in this respect to the description and figure of Hooker.

The remaining species which I shall mention was a kind of fescue growing 3 to 5 feet high, which I consider an undescribed species, and will here append its characters:

Festuca Oregona.—Culms tall, 3 to 5 feet, rather slender, slightly scabrous. Culm leaves few and distant, the sheaths 6 to 8 inches long, blade narrowly linear, 2 to 4 inches long; sheaths scabrous. Panicle erect, narrow, strict, but loose; branches mostly in fives, very unequal, the shorter ones nearly sessile, the longer 1½ to 2 inches, flowering nearly to the base; spikelets about 3-flowered, 4 to 5 lines long, pedicels and rachis hispid; glumes narrowly lanceolate, 2 to 2½ lines long, nearly equal to the lower

palet, 3-nerved, hispid on the keel, otherwise slightly scabrous, acute; lower palet linear lanceolate, slightly compressed, rather indistinctly 5-nerved, acute, but not awned, minutely scabrous, somewhat scarious and bronzed at the tip. Oregon.

This has some resemblance to *Festuca pratensis*, but has a denser panicle, with more numerous branches, and is not nodding but erect. The glumes are also longer, and the palets blunter and thinner. It approaches the section *Atropis* of *Poa*, which seems to connect *Poa* and *Festuca*.—Geo. Vasey.

More About Ballast Plants.—A few days ago I paid my first visit of the season to the ballast ground near Philadelphia; some matters of interest were observed, of which I am prompted to make mention. Since the publication of my article some months ago on these new comers, I have received many letters of inquiry, as to certain plants herein mentioned, and have had a demand for specimens far beyond my ability to furnish, showing a developing interest in the matter of introduction and distribution of species.

Some plants that were very abundant last year I could find no trace of, but others in their stead of equal beauty and interest. In the following list will be noticed many species that are occasionally met with in waste grounds around cities and often in neglected country places, but it is probable that the specimens collected were from imported seeds:

Ranunculus bulbosus, L., and *R. repens*, L., both quite abundant; the former presents no variation from its usual condition, but the latter is the typical form: prostrate, very hairy, and sending out long runners, exhibiting the same characters as specimens from Europe now in my herbarium. There is, however, a plant growing along the shores of the Delaware River near Philadelphia, that I have been familiar with for the last twenty years, and have never seen it produce a runner of any kind, or show any disposition that way. It is upright in habit, often very smooth, with leaves three times the size of those on the ballast plant. Prof. Gray, to whom I sent a specimen last year, writes me, that it is one of the many forms he has had to refer to *R. repens*, L. When I have examined some of our *Compositæ* and been sorely puzzled to know what species they were on account of their close resemblance one to another, and have remembered this *Ranunculus* with its many variations, and so strikingly different in habit, appearance, &c., I have asked myself the question, what is a species, and what are characters on which species and varieties are based?

Erysimum cheiranthoides, Br., has sparingly occurred in former years, but I found only one specimen.

Three species of *Diplotaxis* are quite common, *muralis*, Boiss., *monensis*, Hudson, and *tenuifolia*, Boiss. The last seems to be fast gaining a foothold.

Thlaspi arvense, L., one specimen collected. It has occasionally been found in former years.

Camelina sativa, Crantz, is quite plentiful, some of the specimens more than two feet in height. This species occurs frequently in grain fields and on roadsides, but usually not of such luxuriant growth.

Lepidium ruderale, L., is very abundant. Two specimens of *Lepidium campestre*, L., were collected. I have seen this occasionally on roadsides in the vicinity of Philadelphia, but it is rarely met with.

Senebiera coronopus, DC., and *S. didyma*, Pers., are both abundant.

Sisymbrium Sophia, L., not so plentiful as in former years.

Reseda Luteola, L., is becoming quite common.

Silene inflata, Sm., and *S. noctiflora*, L., are as abundant as I have ever seen them.

Silene dichotoma, Ehrh., one plant only was seen. This is the first time it has been found here.

Lychnis vespertina, Sibth., and *L. diurna*, Sibth., are quite common again this year

Potentilla reptans, L., and *P. anserina*, L., are both abundant. The former seems more inclined to produce flowers than in former years.

Poterium sanguisorba, L., a single specimen was collected. It has not been detected on the ballast deposits before.

Trifolium hybridum, L., has not yet appeared. It was quite abundant last year and in one locality seemed likely to become established, but the "March of Improvement," has eradicated it entirely from that spot.

Vicia Cracca, L., but a single specimen was found. It being so showy in flower it will scarcely survive the season, as "the boys" carry off most of the attractive plants.

Centaurea Cyanus, L., is quite common again.

Carduus pycnocephalus, Jacq., a single specimen appeared last year for the first time, now thirty or forty plants are growing in a space not more than fifteen feet square.

Anthemis nobilis, L., only one specimen collected; a plant was growing near the same locality last fall but it did not flower.

Veronica hederæfolia, L., and *V. Buxbaumii*, Tenore, are both in flower, but are not plentiful.

Echinospermum Lappula, Lehm., is just coming into flower, was quite abundant last year.

Echinospermum Redowskii, Lehm, is growing very luxuriantly on the railroad embankment. This according to Gray's Manual occurs on the Western plains and at St. Paul, Minnesota. The single marginal row of stout prickles on the nutlets is well marked, and it seems to flower much earlier than the other species.

Myosotis arvensis, Hoff., is growing in a few places.

Asperugo procumbens, L., one specimen only. This was first detected by Isaac Burk, of Philadelphia, about two weeks ago.

Linaria spuria, Dest., will be abundant again this year.

Carex hirta, L., is growing quite luxuriantly, and if not molested will firmly establish itself; the creeping roots are spreading rapidly in all directions.

Alopecurus agrestis, L., was collected in two localities. I found but one specimen of it last year.

On a lot of new ballast was growing *Godetia quadrivulnera*, Spach., and *Gilia capitata*, Douglass, both Western species. I am puzzled to know how they got here, unless some ballast from California has been deposited, which I have not been able to ascertain. Some half dozen species of each were collected.

This transportation of seeds and consequent introducti n of new plants, as I have repeatedly remarked, is an interesting matter for consideration, and as I review these ballast deposits, and detect so many strangers, I feel a re-awakening of that interest which a ramble about our fields and woodlands fails to create.—Isaac C. Martindale, *Camden, N. J.*

Notes on Winter Flora of Florida.—Christmas day, 1876, found myself and family in the much praised, over-rated town of Jacksonville. From Savannah we had been accompanied by constant rains, thus giving me little opportunity to dodge out at the stations and secure specimens of Natural History in any department. In that Mecca of Northern travel, Jacksonville, I saw but little of interest to a naturalist in the way of Botany. The Live Oaks and the *Tillandsia* which shrouds them serve to render the town more pleasant than it would otherwise be. The Mistletoe seems to be playing havoc with many of the trees. At this season I did not expect to obtain very many flowers in bloom, and a recent frost had destroyed many species, natural and cultivated. Having therefore looked over the city so far as we could in the midst of a constant drizzle of rain, we prepared to leave for a more favored section. St. Augustine

was chosen for obvious reasons. A ten hours ride by river and rail brought us to the "Ancient City" as its antiquated people delight to call it. The beauties of the floral scenery of the St. Johns have been so often recounted by admiring tourists that I will say little. There is something of interest to the lover of nature in its grand old Live Oaks, Cypress trees, Palmettoes, and other peculiar forms of the vegetable world that ornament the banks in a dense overhanging canopy of green or gray.

Having said this much in a general way, I will now note such species of plants as I found in blossom, leaving for another time much that was interesting about the foliage and hardy parts of a flora that possesses even in its winter dress an exceeding interest. At St. Augustine I collected in January, *Aster flexuosus*, Nutt., abundant on salt marshes; *Houstonia rotundifolia*, Gr., in woody situations; of Ferns, which always attract the eye, some species are abundant; on the roofs of houses and trunks of trees, *Polypodium incanum*, Swtz., and *Vittaria lineata*, Swtz., the latter confined to the palmetto. In the pine barrens near the city was found *Pteris aquilina*, L., and its variety *caudata*. The list from St. Augustine is meagre, but an examination of my collection will show a large number of species representing the wood, foliage, etc

At Cedar Keys I found a more interesting field by following the footprints of Dr. Garber who collected here last year I believe. The results obtained from Jan. 15th to to Feb. 10th are: On Sea Horse Key, *Gelsemium sempervirens*, Ait., *Chaptalia tomentosa*, Vent., *Solidago* —— ——? *Physalis lanceolata*, Mx. On the mainland I obtained *Pinguicula pumila*, Mx, *Pinguicula lutea*, Walt., *Lycium Carolinianum*, Mx., both in flower and fruit. *Borrichia frutescens*, DC., the two last on salt marshes near high tide. The *Lycium* I found on both coasts.

On Way Key, *Crotolaria ovalis*, Pursh., *Chiococca racemosa*, Jacq., *Alnus serrulata*, Ait. On Cedar Key, *Vachellia Farnesiana*, W. and Arn.

The *Ceratiola ericoides*, Nutt., and *Zamia integrifolia*, Willd., are abundant on the main land, and with many other evergreen forms add beauty and variety to the landscape.

In the vicinity of Gainsville I secured, *Vaccinium corymbosum*, L., *Astragalus obcordatus*, Ell., *Asclepias amplexicaule*, Mx., *Vaccinium myrsinites*, Mx., *Hypoxis erecta*, L., *Viola sagittata*, Ait., *Viola primulaefolia*, L., *Prunus Caroliniana*, Ait., *Cornus florida*, L., *Cercis Canadensis*, L., *Acer rubrum*, L., *Pyrus arbutifolia*, L. var. *erythrocarpa*, *Chaptalia tomentosa*, Vent. Of ferns, *Asplenium ebenum* and *Woodwardia angustifolia* were found near the "sink." The curious *Lycopodium alopecuroides* and *Sphagnum squarrosum*, occur in wet, pine barren bogs. The yellow Jessamine exists by millions everywhere, climbing trees to the height of twenty feet or more. The *Utricularia subulata*, L., is found at Baldwin in ditches and shallow ponds.

My observation was that the climate of the West or Gulf coast is much more equable and mild, than on the Atlantic slope, a fact which the more advanced state of vegetation, from Cedar Keys to Gainsville fully proves.—W. W. Calkins, *Chicago, Ill.*

Recent Publications.—*Contributions to American Botany, VII.*—Descriptions of New Species of Plants, with revisions of *Lychnis*, *Eriogonum* and *Chorizanthe*, by Sereno Watson.

This is a pamphlet of about 35 pages and shows how busy Mr. Watson has been. He has here described nearly 50 new species of plants and has revised three genera, one of them an exceedingly large and difficult one. *Lychnis* is revised with eleven species belonging to America, five of them being new. One glancing over their range is struck with the fact that every one of them, with perhaps the exception of one, is confined to Greenland and high north or to the summits of Western mountain peaks. Prefacing his revision of *Eriogonum*, Mr. Watson remarks that seven years only have elapsed since the revision of the *Eriogoneæ* by Dr. Gray, but so many new species have

been described that it seems not useless to give again a summary of the two larger genera of the group. This is an enormous western genus, numbering 95 species, seven of them being described for the first time in this contribution, six by Mr. Watson, and one by Prof. Porter. *Chorizanthe*, a polymorphous genus, with which the genus *Centrostegia* is united, numbers 25 species, six of which are here described for the first time. Besides these three, twenty other genera have received an accession of species. *Amarantus* has received five new species; *Habenaria*, three; *Lavatera*, *Lupinus*, *Œnothera* and *Elaterium*, each two; *Thelypodium*, *Malvastrum*, *Psoralea*, *Lythrum*, *Mentzelia*, *Angelica*, *Mirabilis*, *Abronia*, *Rumex*, *Oxytheca*, *Atriplex*, *Corallorhiza*, *Sisyrinchium* and *Erythronium*, each one.

Catalogue of the Society for the Exchange of Plants, Budapest, Hungary, 1876.—This catalogue is of large dimensions and contains some very valuable plants. Richter Lajos especially desires to receive *Rosa*, *Rubus*, *Orchis*, *Scleranthus*, *Hieracium*, *Ebatine*, *Viola*, *Primula*, *Salix*, *Verbascum*, *Pulsatilla*, and *Polygonum aviculare*.

Proceedings of the Academy of Natural Sciences of Philadelphia, Part I.—January, February, and March, 1877.—The botanical papers are not numerous or lengthy. The first paper is the termination of a little discussion begun and carried on in *Nature* by Dr. Gray and Thos. Meehan in reference to the fertilization of *Browallia elata* The next paper of botanical interest is a List of Ballast Plants in the neighborhood of Philadelphia, by Isaac Burk. The list numbers 125 species, giving the locality of each and also its native habitat except when it belongs to the British coasts. M. C. Cooke has a paper on the *Valsei* of the United States. Among the *Valsei* he includes the names of only two genera, namely, *Valsa* and *Melanconis*. The paper is presented as a contribution towards the more complete and satisfactory knowledge of the Fungi of the United States. *Valsa* numbers 133 species, and *Melanconis* five. Mr. Meehan also has some short papers, or rather notes, on "Influence of Nutrition on Fertilization," "The Bluebird and Holly Berries," "Vitality of Seeds under Low Temperature," and "Evolutionary Law, as Illustrated by Abnormal Growth in an Apple Tree."

American Naturalist, July.—*Habenaria rotundifolia* must be called *Orchis rotundifolia*, as after examination of live plants sent to the Botanic Garden, Dr. Gray has found the plant to be a genuine *Orchis* and a true congener of *O. spectabilis*. Dr. J. H. Mellichamp has a note recording some late observations made by him upon the intoxicating power of the sweet secretion of *Sarracenia variolaris*. In 1874 he had stated that the sweet secretion was simply a lure to insects and not stupefying or intoxicating, but another observer having arrived at conclusions directly opposite, fresh experiments were made which resulted in the same conclusions that were first arrived at. Dr. Mellichamp also sent two phials of the fluid found at the bottom of the Sarracenia tubes. Experiments were made in the Botanical Laboratory and confirmed the following statement made by Dr. Mellichamp: "Pour out a teaspoonful or two of the fluid in an ounce measure, or a small wine glass. Throw in a fly so that his wings will be wet or slimed. He will in a few minutes cease to struggle and will apperr as if dead. Take him out after a while and let him dry, and in about half an hour he will revive." The experiments with the fluid are still in progress, and we are promised the detailed results in the August Naturalist.

The Germination of the genus Megarrhiza, Torr.; *by Asa Gray*.—The following article is of such general interest that we quote it entire from the *Am. Jour. of Science and Arts* for July:

"The object of this brief communication is to describe a peculiar structure which *Megarrhiza Californica* exhibits in germination, and to call for observations upon other species, at the time of germination, in the hope of thereby extending our present imper-

fect knowledge of this genus of big-rooted *Cucurbitaceæ* of our Pacific coast. For the extraordinary peculiarity in question, being one which, in other cases, is known to exhibit itself in certain species of a genus (as in *Anemone* and *Delphinium*), and not in others, so it may in the present genus give aid in distinguishing the five species which have been characterized upon more or less incomplete or scanty materials.

"The first species known was from Oregon; the specimens, being in flower only, were referred in Hooker's Flora Borealis Americana, i, 220, to *Sicyos Angulatus*, but were separated in Torrey and Gray's Flora of North America, i, 542, under the name of *Sicyos Oreganus*. In the course of time it was found that there was a similar if not identical species in California, and apparently more than one, that they were perennial from very large and fleshy roots, that, while the flowers much resemble those of *Echinocystis*, the seeds were turgid, marginless, and with thick and fleshy cotyledons. Dr. Torrey, upon whom the examination of these plants devolved, many (about thirty) years ago proposed for them the generic name of *Megarrhiza;* but he refrained from publishing it, even omitted all mention of it in his account of Dr. Bigelow's excellent collection made in Whipple's Expedition (Pacif. R. Rep. iv, 1857), although good materials of that and other collections were in his hands, because he could not make up his mind whether he had to do with one variable species or with two or three. But in the sixth volume of the Pacif. Railroad Rep., which bears the same date of 1857, in Dr. Newberry's list of plants collected in Williamson's Expedition (p. 74), two species are enumerated, thus:

"'*Megarrhiza Californica*, Torrey. Petaluma and Sonoma, California; April, in flower.'

"'*Megarrhiza Oregana*, Torrey. On the shores of Klamath Lake and banks of Willamette River, O. T.; August and September, in fruit.'"

"Before this, however, viz: in March, 1855, Dr. Kellogg, of San Francisco, communicated to the California Academy of Natural Sciences (Proc. Calif. Acad., i, 38), an account of one of these species, apparently the second, under the name of *Marah muricatus*.

"A few years later, some plants having been raised in France from Californian seeds, M. Naudin (in Ann. Sci. Nat., ser. 4, xii, 154, t. 9, under date of 1859, but, as the letter-press shows, not printed until 1860 or 1861), published the plant which Dr. Torrey had called *M. Californica* under the name of *Echinocystis fabacea*. This extension of *Echinocystis* was adopted by Bentham and Hooker in their Genera Plantarum. It was, moreover, anticipated by Dr. Kellogg, who, in a second communication to the California Academy, under date of June 4, 1855, re-describes his former *Marah muricatus*, states that it 'legitimately belongs to *Echinocystis*,' and gives it the name of *E. muricatus*. When, shortly after Dr. Torrey's death, I superintended the printing of his account of the plants collected on our Pacific coast in Wilkes' Expedition, I found that he had left the article on this genus unwritten, and apparently had not determined either upon the number of the species or upon the distinctness of his proposed genus.

"When in the recent preparation of the Botany of California the subject came to be studied anew by Mr. Watson, with the aid of more extensive materials, and when these materials were found to exhibit such diversities that at least five species had to be recognized (Bot. California, i, 240), with notable differences in ovary, fruit, seeds, etc., but no approximation to the eastern *Echinocystis*, it could hardly be doubted that Torrey's genus ought to be reinstated; and this was accordingly done.

"The *M. Californica* had been raised in the Botanic Garden of Harvard University many years ago, but I had not seen the germination; and we were never able to bring the plant into blossom, as it invariably died down to the ground soon after making a moderate growth. On germinating some fresh seeds early this spring, I was somewhat surprised to find that they came up in the manner of beans. Instead of remaining

hypogæous, as from the great thickness of the cotyledons would have been expected, the body of the seed in its shell was raised well out of the soil upon what seemed to be a well developed radicle, like that of *Echinocystis*. If the cotyledons had expanded, though remaining fleshy, in the manner of *Phaseolus*, the difference between this and *Echinocystis*, with cotyledons truly foliaceous in germination, would be much less than had been supposed. I waited long to see if this would occur; I also waited in vain for the expected development of the plumule from between the bases of the fleshy cotyledons. After the lapse of about a fortnight, the plumule in all three of my germinating plantlets came separately out of the soil of the pot; and, on exposing the whole to view, the following state of things came to view: The plumule came forth from the base of what appeared to be an elongated radicle (of two or three inches in length); and below this the thickening of the root, which acquires enormous dimensions in old plants, had already commenced. A large amount of the nourishing matter stored in the cotyledons had been carried down to the root and used in its growth as well as that of the plumule. The latter came from a cleft at the very base of the seeming radicle, which otherwise appeared to be solid. But on cutting it across toward the base this was found to be tubular; and later, when more spent and beginning to wither, this stalk was separable from above downward into two.

"This, therefore, is a case in which long petioles to the cotyledons (of which there is no appearance in the seed), connate into one body, are developed and greatly lengthened in place of the radicle, which is thus simulated. It is the same as in *Delphinium nudicaule* of California, and some other species; only in that genus the cotyledons expand and become foliaceous. In the horse-chestnut petioles are also developed to the cotyledons to a moderate extent, but without union, (see Gray's First Lessons, fig. 24), thus pushing the radicle and plumule well out of the firm seed-coat, in which the very heavy and fleshy cotyledons remain; and the radicle itself, as in the pea, does not further lengthen. In *Ipomœa leptophylla* the radicle remains in like manner short, while petioles to the (here foliaceous) cotyledons develope to a great length, bringing these separately out of the ground, and the plumule between follows later.

"Botanists on the Pacific coast are earnestly requested to examine the germination of all the species of *Megarrhiza*, and to compare them with the description here given. At least three species should be met with near San Francisco, and in neighboring parts of California. According to the characters assigned by Mr. Watson in the Botany of California, *M. Californica* should be known by its obovoid seeds, of less than an inch in length, with a small hilum at the narrow base; *M. Marah*, by its more numerous seeds horizontally imposed in a large fruit (of four inches in length), each seed roundish and depressed, flattened, an inch in diameter and about half as thick, with a prominent lateral hilum. *M. muricata*, by a nearly naked fruit only an inch in diameter, containing only two globose seeds of half an inch in diameter. *M. Oregana*, which is known to occur from the Columbia River to the north of California, appears to have seeds resembling those of *M. Marah*, but rather smaller; but they are not well known. The remaining one, *M. Guadalupensis*, of Guadalupe Island, off Lower California, is much out of ordinary reach, unless it should be found in the southern part of the State. Mature fruits and seeds of all the species are much desired."

All communications should be addressed to

John M. Coulter, Hanover, Ind.,

or, M. S. Coulter, Logansport, Ind.

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Poisonous properties of the Leguminosæ.—*Leguminosæ* from being once regarded as almost wholly innocent of poisonous properties, now comes to be considered as among the chief of sinners. Following hard upon each others heels come charges of damage to stock from *Oxytropis Lamberti* in Colorado; *Hosackia Purshiana* in Arizona; and two or three species of *Astragalus* in California. As if to complete the bad record against the order, Prof. H. C. Wood, M. D., has just published in the Philadelphia Medical Times, for August 4th, 1877, an account of a new and exceedingly poisonous alkaloid discovered by himself in the bean of *Sophora speciosa*. This he properly names *Sophoria*. It appears to act as a spinal sedative. "One-twentieth of a grain, of a very imperfect specimen, produced in a half grown cat deep sleep lasting many hours, and "the minutest speck of it produced in two minutes almost entire paralysis in the frog." In fact it has some striking points of resemblance to the action of Calabar Bean, of which it is a near relative. Mr. Bellinger, of Texas, states that the Indians, chewing half a bean, go off into "hilarious intoxication," followed by a sleep of a couple of days, and that dangerous symptoms are likely to follow the use of an entire bean. It is fortunate that the investigation of this drug has fallen into the hands of so competent and conscientious an investigator as Dr. Wood, as we may promise ourselves that in his "findings" crude guesses will not be reckoned as established truths.—Dr. J. T. Rothrock.

Shipping Live Plants.—On page 107 of the Botanical Gazette is noticed the sending of a suite of American plants by myself to the Botanical Garden of Sydney, New South Wales, Australia. They were packed in wet sphagnum, in a tight wine cask, and sent to San Francisco, to expedite their transit. The venture proved a failure, as the plants mostly softened on the way. On the 9th of May last, I tried another venture. This suite consisted of the new *Nymphæa* from Florida, *N. lutea*, *N. odorata*, *Helonias bullata*, *Erythronium Americanum*, *Claytonia Virginica*, the new *Amarylli Atamasco (?)*, *Thalictrum anemonoides*, *Pyxidanthera barbulata*. I procured plastic clay, and moistened it so that it could be conveniently worked in the hand. A wine cask was again used, and every root was compactly surrounded with the clay—it being packed in well, and hard with sand. I have to day, under date of June 28, received a letter from the director, Mr. Charles Moore, which to my joy, announces the arrival of the plants in the best condition, except the *Pyxidanthera*, which I should say was in poor state before the packing. Mr. Moore's words are: "The first trial was a failure. The second has been attended with the most perfect success, as the rhizomes of *Nymphæa lutea* and *N. odorata* are as fresh as when packed for transmission to this place. I am also much pleased to inform you that with the exception of one kind, *Pyxidanthera*, which is dead, all the other plants sent with the Nymphæas are alive."

I think then that for living plants to be shipped on long voyages, moist clay must be regarded as the best packing material. When it is intended to send entire plants, the roots should be firmly packed in clay, and the upper parts embedded in dry moss or hay.—Samuel Lockwood, *Freehold, N. J., Aug.* 3, 1877.

VITALITY IN FERNS.—*Polypodium incanum* has been called the "Resurrection Fern" on account of its wonderful vitality, but our common *P. vulgare* appears to be no less tenacious of life. In November, 1876, as an experiment, I threw a plant of this latter species under a bench where it remained in a perfectly dry state, and subject to the warm atmosphere of a heated room, until late in April, 1877—a period of more than five months. It had become so dry and shriveled that it did not seem possible for any life to exist, yet under the influence of frequent rains it soon began to start and is now growing moderately.

Just how long life may be retained under such conditions as those to which this plant was subjected would seem to me to be an interesting subject for inquiry, and one that might lead to useful results in the transportation of certain plants.

It may not be out of place in this connection to state that last spring I took from some pressed herbarium specimens of *Trichomanes Petersii* sent to me a short time previously by Mr. Peters—I do not know how long they had been collected, but presume for a short time only—a plant and placed it under a bell glass. In a very few days it began to straighten up its tiny fronds and is now living and growing.—GEO. E. DAVENPORT, *Boston, Aug.* 3, 1877.

ADIANTUM CAPILLUS-VENERIS.—In a private letter Mr. Davenport makes the following statement in reference to this fern: "It might be an interesting fact to state that I have succeeded in cultivating this species from Utah in the open garden and carried my plant safely through the long severe winter of 1876–7 without any other protection than some loose brush thrown over it. The plant was set out in May, 1876, in some rock work by the side of a little brook, and had an open southern exposure. It grew finely all through the year, and proved itself hardy by surviving our last severe winter, and is now a fine, compact, healthy plant."—J. M. C.

NOTES FROM SOUTH WESTERN VIRGINIA.—Mr. Howard Shriver has just visited New River, a most interesting locality, and writes as follows: "I found *Cedronella* in a new spot at Carter's and Forney's (Allisonia C. H.). I also found at Carter's abundance of *Pyrularia oleifera*, but the blooms had nearly all fallen, leaving only one plant, with one pear in an unripe state. The plants seemed flourishing enough, so that I was at a loss to determine whether the failure to fruit resulted from the excessive drought, or from late frosts, which cut garden plants badly as well as some wild ones, or from some other cause. The flowers came several at a time and regularly dropped, until many stems were terminated by a single flower at the time of my arrival.

Halesia tetraptera had gone out of bloom, but the trees had made plenty of fruit, which was then about a quarter of its full size. *Chionanthus Virginica* was nearly out of bloom. The shrubs were found in abundance all along the river. *Ptelea trifoliata* lined the river shores for several miles and was in full bloom. So was *Celastrus scandens*. A plant much resembling *Phacelia parviflora* appeared sparingly on the shore. It does not answer satisfactorily to the above name and may be a variety. *Sedum ternatum* abounded, but I saw not a single *S. Nevii*, which abounds at Allisonia along with *S. ternatum*. I found here for the second time *Aspidium Goldianum*, Hook, and *Cystopteris fragilis*, Bernh., also *Asplenium angustifolium*, Mx. While sitting on the bank of New River with Forney, I desired him without moving to pass to me all the ferns he could reach, which were as follows: *Adiantum pedatum*, *Asplenium Trichomanes*, *Asplenium ebeneum*, *Aspidium acrostichoides*, var. *incisum*, *Cystopteris fragilis*, *Onoclea sensibilis*, *Woodsia obtusa*, *Osmunda Claytoniana*, and one or two others of which I am not certain, perhaps, *Cystopteris bulbifera*. I also found elsewhere, *Polypodium vulgare*, *Pteris aquilina*, *Pellæa atropurpurea*, *Asplenium Ruta-muraria*, *Camptosorus rhizophyllus*, *Phegopteris hexagonoptera*, *Aspidium marginale*, *Botrychium Virginicum*,

which about completes the list of New River at Carter's Ferry. At that date (June 2–13) *Phlox subulata* had gone out of bloom, also *Alsine stricta* and *Dianthus Armeria*. *Ruellia (strepens?)* was not yet in bloom, *Baptisia australis* in full flower, *Draba ramosissima* in bloom, *D. verna* in seed. *Nepeta Glechoma* was in infinite profusion, but miles of country produced not a single anther cross, all was our sturdy typical Wytheville plant. I found some huge leaved plants, but agree with Mr. Forney that all *large leaved ones are flowerless!* *Rhus aromatica* was out of bloom, the fruit already turning red. *Spiranthes vernua* was all along the shore, *Iris cristata* and *Phlox reptans* both almost out of bloom, *Menispermum Canadense* in full flower, some vines with good fruit, as good to the taste as an old grape. The most beautiful plant I met was that splendid ornament of the rocky cliffs *Heuchera*, with its dark green, mottled, or purple leaves All cliffs are beautified by it, usually along with the spray of *Cystopteris*, or the festoons of *Aristolochia Sipho* (in flower), or the beautiful *Ampelopsis*. *Brunella*, *Pentstemon*, *Castelleia*, were all in bloom, also *Allium cernuum*, *Sisyrinchium*, *Aplectrum*, *Liparis*, *Spiræa Aruncus*, *Medeola* (with 11 leaves), *Arisæma Dracontium*, *Kalmia*, *Rhododendron maximum* was out of bloom, *R. Catawbiense* not yet in bloom. *Pachystima Canbyi* at New River and Allisonia had neither flower nor fruit, but I had gathered a few good sized fruits at Wytheville before I left town (June 2). *Uvularia grandiflora and perfoliata* were both in fruit, the former abundant, the latter rather rare. At Carter's we met with a Sycamore 24 feet in circumference, with two of its limbs, one springing out of the north, the other of the south side, approaching each other on the east side and *grafted together*. The tree is hollow and is at times used by travelers as a camping place. While there I found a family of pigs in possession of it.

All the *Aquilegia* I have met with is small in flower and in height, except those I found on New River and in Pulaski County. On these plants, four or five feet high, the flowers were correspondingly huge, measuring nearly two inches. Is the prevailing small variety the common plant, or those very rare ones which are large in size of flower and stem? The flowers are scarlet without and yellow within. To my mind there are three varieties: first, these coarse, heavy giants with dark red flowers; second, our plant at Wytheville, a foot and a half high with intermediately delicate, divaricate branches, and flowers of brighter and prettier hue and more delicate structure than No. 1; third, a diminutive variety a foot high, but oftener under that measure, where the yellow interior led me at first to suppose I had a yellow variety, but it was merely a preponderance of the inner yellow, the exterior being the ordinary red or scarlet. Nos. 2 and 3 inhabit steep hills, or cliff faces, or the upper face and clefts of rocks. No. 1 inhabits deep shady woods, or fence corners on the level shores of New River in fine, rich, deep mold, far removed from the habitat of Nos. 2 and 3."

PLANTAGO MAJOR.—While botanizing this summer I was very much struck with a large patch of common Plantain. The plants were in a moist spot which seemed most favorable for their development and hundreds of them were standing so close that the ground was completely matted with their large leaves. Three peculiarities at once struck my attention. All the plants had coarsely toothed leaves, branching spikes, and were two or three feet in height. Upon referring to the books I find that the toothed leaves and long stems occasionally occur, and the GAZETTE has already recorded some branching spikes noted by Mr. N. Coleman and Mr. I. C. Martindale. Other patches have since been found and the coarse teeth are invariably present, the branching spikes and great length of scape and spike not always. Neither Dr. Gray nor Dr. Chapman give any measurements. Dr. Beck gives scape 8–12 inches and spike 2–6 inches, while Prof. Wood comes nearer the facts in putting the scape 1–3 feet and the spike 5–20 inches. I measured five specimens that I had brought in, and I had not taken the

longest because they were too unmanageable, and found the scapes to be 40, 42, 43, 44 and 45 inches, and the spikes 17, 18, 19, 21 and 22 inches in length. The branches of the spikes ran from three to ten in number and were from one to two inches in length. These branches nearly always forked again, making quite a dense brush on the end of the spike. The outermost, that is the lowest, branches invariably forked, the others not always. Occasionally it looked as if the original spike had been bitten or broken off and the lateral buds developed into branches to compensate for the loss of the terminal bud. But such arrest of the growth of the terminal bud could not always be made out, and in some specimens it was undoubtedly not the case.—J. M. C.

Notes from West Virginia.—During a trip up into West Virginia the first two weeks in July, made for the purpose of botanizing, I found on the banks of the Guyandotte River, near Barboursville, specimens of *Cleome pungens* growing wild. There were between 75 and 100 plants growing in a clump and a few others scattered along. They stood about half way between the water and the river bank, on the top of which was an old deserted house. It was about 50 or 75 feet from the plants and no sign of a garden, or, indeed, of any cultivated ground, was visible around it. They seemed to be perfectly naturalized and were growing finely. As this locality is within the limits of Gray's Manual, the plant deserves a place in that work. I am also informed by Mr. Lloyd, of Covington, that he found a patch of the same plant growing wild near the line of the Cincinnati Southern R. R., a few miles back of Covington.

On the top of the Hawk's Nest, on New River, I found a number of plants of *Coreopsis Conradii*, but not in bloom, and *Cheilanthes lanuginosa*. Gray's Manual gives the habitat of the latter as Wisconsin, Iowa, Missouri and westward, and if I am not mistaken in the species, the Mountains of Virginia will have to be added.

Cuphea viscosissima was found in an old field just above the Hawk's Nest.—Joseph F. James, *Cincinnati, O.*

Variations.—I have found the White Pine with leaves in sixes, some few fasicles in sevens. The sixes were quite abundant. The *Arisæma Dracontium*, Schott., is quite common here with leaflets from 15 to 17, and I have found one with 22 leaflets. The running blackberry is also frequent with flowers quite double and of a pinkish tinge.—N. Coleman.

Cuscuta racemosa.—In the January number of the Gazette, Dr. Engelmann gave a warning to the farmers, who wished to cultivate the Alfalfa, or California clover, to beware of the dodder, *Cuscuta racemosa*, which had always accompanied it in Europe and California. The warning was sent, throughout this region, to the county papers, but in spite of it all, seed agents have succeeded in running in a great deal of Alfalfa seed. As a consequence, a short time ago, after the clover had started well, I began to receive specimens of the plant encircled by a "troublesome little vine," and every body wanted to know what it was. It was the genuine *Cuscuta racemosa* in good flower and fruit, and it has come up in every Alfalfa field in this county. The agricultural editors of several widely circulated papers are recommending it and doing what they can to bring this annoying parasite into our fields.—J. M. C.

Jeffersonia diphylla, Pers.—In the vicinity of Hanover, Ind., this interesting plant may be found during the months of March and April, bedecking all the river hills with a profusion of bloom. As it is so abundant on the Ohio bluffs, one would naturally expect to find it abundantly in as favorable localities back from the river, but as yet none have been found except a very few specimens in a single little thicket. Were *Jeffersonia* local along the river its absence from other parts of the county would not

seem so striking. While thus noticing a selected range in reference to dissemination, another peculiarity comes to mind, viz., that on these same hill sides, it seems to select a *zone* of growth. This zone commences about the middle of the hill and with this as a base extends about half way to the top; the plants being most thrifty and abundant on the southern exposures. There is certainly something peculiar in this limit of range, as the lower portions of the hills offer, to all appearances, as favorable conditions for growth as the upper. The same might also be remarked in reference to many localities back from the river.

However the special object of this note is to point out some peculiar effects of cultivation upon this plant. The specimens I have are from the garden of Mr. E. A. Rau, Bethlehem, Penn., and the peculiarities are that *the leaves are prominently 4 to 5 lobed—lobes acute and mucronate*. I have just examined some 40 specimens collected here with the following results: 80 per cent *entire to undulate*, and 20 per cent *distinctly toothed;* in no specimens that I have ever seen have the leaves appeared lobed. We further notice that the leaves of the cultivated *Jeffersonia* are 4 to 5 times as large as those found in the woods and the pod is also much larger and heavier. The flowers the writer has never seen, but would infer that they were also much larger. I take the liberty to append a note from Mr. Rau in reference to this plant. He says, "The *Jeffersonia* was taken from the garden of Mr. Jacob Wolle, of Bethlehem, Penn., and as the plant has been detected by Mr. Wolle near Narrowsville, Bucks county, along the Nockamixon rocks, this may be the source of the specimens of which we write." Mr. Rau further adds that however uncertain the length of time this has been cultivated by Mr. Wolle, he knows it to have been under cultivation more than 12 years. Doubtless many others have noticed variations as a result of cultivation and failed to give publicity to their observations. But it seems to me both interesting and profitable to notice such marked effects as the one just described.—A. H. Young, Hanover, Ind.

Natural Grafting.—Some five miles north-west of Hanover I was surprised to find a good-sized tree of *Carpinus Americana*, or Water Beech, apparently growing on the trunk of *Fagus ferruginea*, or the common Beech. A closer examination showed that the trees had started close together, and instead of one crowding the other out, they had coalesced, their bark had become continuous, and below where they fork it is impossible to tell which is which. The fork looks like a regular branch, the Water Beech coming out at quite an angle, according to its usual habit.—J. M. C.

Habenaria peramœna, Gray.—This showy Orchid has added much of beauty to our collections this summer. Orchids are exceedingly scarce in this range, and hence the advent of one in any quantity is most welcome to botanists. Now, the very interest and peculiar attactiveness of this plant this year lies in its abundance. It was first found here by the writer in July 1873, and has not been seen since by him, although I believe others have collected a very few specimens. Now this year it appears in considerable abundance both in the old locality and in many new ones, which in past years have been tramped over again and again without any finds. It is hardly reasonable to suppose seeds have been borne to six or seven localities, as many miles apart, during the past year, and, on the other hand, if these plants have lain dormant so long there is much interest in a rest of such long duration.—A. H. Y.

Spermacoce glabra, Michx.—We are glad to be able to record the rediscovery of this desirable plant. In 1870 it was named in the list of Mr. A. H. Young, as growing in Jefferson county on the river bank. As no specimens were saved, the discovery was practically of no value, and after repeated searches along the river bank doubt began to arise in our minds whether we really were entitled to the plant or not. In 1874, in my incom-

plete list of Jefferson county plants, trusting to Mr. Young's botannical acuteness, I included this species at the same time following him in the mistake, which was merely an oversight on his part, of putting the time of flowering in May and June. Now it has been discovered again in reasonable abundance, specimens have been made, and our title to it is without a flaw. It is barely in full flower this 6th day of August, thus confirming the date given in Gray's Manual. It is possible that it has been passed repeatedly for *Lycopus*, which it sometimes resembles at the first blush, but the much larger whorls and flowers, and the entire leaves soon separate it from that, and a glance at the developed corolla at once carries us far away from the *Labiatæ*.—J. M. C.

Notes on the Flora of Clinton County, Mo.—It was the privilege of the writer to spend a few weeks of the past summer on the prairies of North-western Missouri, and the list of his collection, together with some brief notes are presented to the readers of the Gazette.

The country is now nearly all under cultivation, so that tracts of unbroken prairie occur only here and there, in areas of 80 or 160 acres. The water courses, from Clinton county south to the Missouri river, are heavily wooded. An old resident informed me that when she came to the county forty-seven years ago, not a stick of timber was to be seen where now oaks and elms from six inches to two feet in diameter, stand so thick on the ground that it is impossible to drive through the forest without clearing. Certainly tree-growth in that county must have been very rapid!

Three-fourths of the timber trees belong to the genus *Quercus*. *Q. imbricaria*, Mx., forms about one-half of the Oaks and *Q. rubra*, L., nearly a fourth; while *Q. alba*, L., *Q obtusiloba*, Mx., *Q. macrocarpa*, Mx., and *Q. Prinus*, L. var. *acuminata*, Mx., make up the remainder. The flora of the woods is strikingly similar to that of Southern Indiana, consisting as it does of such species as *Geum strictum*, *Mimulus alatus*, *Gerardia flava*, *Desmodium acuminatum*. *Phryma Leptostachya*, etc.

The collection during July and a part of August embraced the following species:

Polygala incarnata, L., seems to be very scarce. Only one specimen was secured.

Trifolium pratense, L. Two heads were obtained having the flowers perfectly white—not even a rosy tinge about them.

Psoralea floribunda, Nutt., scarce. Half a dozen specimens were found, growing in a clump of Post Oaks.

Petalostemon violaceus, Mx. and *Petalostemon candidus*, Mx., very abundant on open prairie. The later comes into bloom about a week earlier than the former and has a shorter season.

Amorpha canescens, Nutt. Plentiful. Certainly the supposition that this plant indicates lead ore becomes false here.

Baptisia leucantha, T. & G. So common that it becomes a troublesome weed in cornfields and pastures. Racemes often 3 feet long.

Baptisia leucophæa, Nutt. Common in rich pastures.

Potentilla argyta, Pursh. Gray says "common westward," but only one plant was seen.

Lythrum alatum, Pursh. Common in pastures and by roadside.

Eryngium yuccæfolium, Mx. Abundant.

Liatris pycnostachya, Mx. Low grounds; very common.

Solidago Missouriensis, Nutt. The earliest Solidago.

Silphium laciniatum, L. Not scarce.

Silphium integrifolium, Mx. More abundant than the last. There seem to be two forms of this species. One is typical except that the stem is not "4-angular" but perfectly round. The other is much more slender, the stem "4-angular and grooved," the

upper leaves ovate-lanceolate, lower lanceolate inclining to spatulate. Comparative measurements of lower leaves, as follows.

First Form.—Length, 4⅝ inches; Gr. width, 2 1-17; width, 1 inch above base 1⅞.

Second Form.—Length, 6 inches: Gr. width, 1 1-16; width, 1 inch above base, ⅜.

Of the second form all but a few of the upper pairs of leaves are conspicuously narrowed toward the base. The stem and leaves are too rough to be referred to the variety *lævc*.

Echinacea angustifolia, DC. Rather rare.

Rudbeckia subtomentosa, Pursh. Abundant.

Coreopsis palmata, Nutt. Tolerably abundant.

Dysodia chrysanthemoides, Lag. Entirely too common along roadsides where it exhales its offensive odor.

Cacalia tuberosa, Nutt. Grows abundantly in wet places.

Plantago Patagonica, Jacq., var. *aristata*, Gray. Very common along roadsides. The var. is quite distinct from the typical form

Ruellia ciliosa, Nees. Very abundant along hedges. Several patches were observed in which the corolla was cream-colored and marked inside with dark lines.

Verbena hastata, L. Called "Iron-weed" here. Grows in pastures, sometimes taking complete possession of them. At least three-fourths of the plants examined were without hastate leaves. Corolla often rose-colored.

Verbena stricta, Vent. Not so common as the last.

Asclepias tuberosa, L. Very showy and very common. A specimen was found having the umbels arranged in two terminal racemes instead of a corymb. Each raceme was about a foot long, bearing the umbels in the axils of the leaves.

Asclepias verticillata, L, Very delicate and by no means abundant.

Acerates longifolia, Ell. Grows in clumps in old pastures.

Habenaria leucophæa, Gray. Rare and beautiful.

Tradescantia Virginica, L. Grows along every hedge. I observed a cluster of ten or twelve stalks having the petals pale lavender color and the filaments bearded with *magenta* hairs.

Cyperus inflexus, Muhl. Scarce. Only six or eight plants were secured.

Boutelona curtipendula, Gray. Grows in patches among the prairie grass.

Tripsacum dactyloides, L. Grows with *Spartina cynosuroides* and resembles it to some extent.—C. R. Barnes, *Madison, Indiana*.

Some large specimens of Arisæma triphyllum.—In the July number of the Gazette, in the article of Mr. Barnes, I find measurements of an *Arisæma triphyllum* from Trimble county, Ky., and a request for the record of a larger one. In this species, as in the others mentioned, Jefferson county still leads. In July, while taking a botanical trip through one of the ravines near Hanover, my attention was arrested by an *Arisæma*, which I felt convinced must exceed the measurements given by Mr. Barnes. Its measurements were as follows: Height 45½ inches: side leaflets 12½ inches long by 8 broad: end leaflet 13½ inches by 7 broad; spread of lateral leaflets 26½ inches; diameter at base of stalk 1½ inches; circumference of corm 7½ inches. It will be noticed that the height of this exceeds that recorded by Mr. Barnes over 15 inches; that the leaflets are from 2½ to 3½ inches longer, but an inch or two narrower; and the diameter of the stalk and corm the same. The length of spadix and spathe could not be obtained on account of their having withered.

This was not an exceptional specimen, since in the immediate vicinity I measured 12 others which exceeded 40 inches in length with other measures proportional, and there must have been fully 100 specimens exceeding 3 feet. A great variation in the propor-

tion between the length and breadth of the leaflets is noticed in measuring, as well as in height and diameter of stalk. What peculiarities of soil and exposure cause such large growths in our plants can scarcely be decided, but the fact remains that many of our plants think nothing of attaining a size at least double that allowed by law.—M. S. C.

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, August.—Dr Gray has an article on "Some Points of Botanical Nomenclature," suggested by some correspondence between a Belgian botanist, A. Cogniaux, and Alph. DeCandolle, printed in the *Bulletin de la Societe Royale de Botanique de Belgique*, 1876. "M. Cogniaux ask some questions, rising out of the way in which genera, their synonyms, and some species are succinctly dealt with or referred to in the Genera Plantarum now in course of publication." "The fact is, that the name of an author, or its abridgment, appended to the name of a genus, or to a specific name, is mere bibliography, stands in the place of a citation of author, work, page, etc." "This suffix of authors' names is not a matter of homage or sentiment, or justice, but a matter of fact, i. e., of historical record. The guiding principle to this record is, that we are not to make an author say that which he has not said." Hence, when a new genus is made and a number of species formerly belonging to other genera are said to be contained in it, the names of the original authors of those species should not be appended to the specific names, but the name of the person who arranged them under the new genus.

American Naturalist, August.—Mr. C. E. Bessey, of Ames, Iowa, has an interesting article recording "Observations on *Silphium laciniatum*, the so-called Compass Plant." Six tables are given giving the bearings of ninety-three leaves. About thirty per cent. of the leaves observed did not vary more than five degrees, forty-two per cent. not more than ten degrees, and ninety per cent. not more than forty-five degrees from the meridian. The variation of fifty-four of the leaves was to the east, and thirty-nine to the west. Many of the leaves had rotated upon their petioles in assuming their positions and most of these had rotated with the sun. One leaf was found to have rotated through at least 270 degrees of arc to reach its final position. Mr. Bessey has also made some examinations with his microscope to see whether the number of stomata upon the two surfaces of the leaf had anything to do with its polarity. His observations all led to the conclusion that the stomata had nothing to do with it, and we are still in the dark as to the cause.

Field and Forest, July.—The leading article is by Prof. J. W. Chickering, Jr., on "A Botanical Trip to Virginia." The article contains quite a list of good "finds," and a comparison of the flora of Norfolk with that of Washington. In the minutes of the Potomac-side Naturalists' Club mention is made of Dr. Vasey reading a paper upon the distribution of trees in the United States, with the promise of its publication in full in a future number.

Gardener's Monthly, August, is full of interesting notes for florists and horticulturists. A brief article on "Rare Plants of Southern Utah," and the notes on Forestry, are of special interest.

Catalogue of Phænogamous and Acrogenous Plants found growing wild in the State of Michigan, compiled by Elmore Palmer, M. D. of Dexter, Michigan. This catalogue was mislaid or it would have been noticed in a former number. It is a neat pamphlet of 16 pages, containing a list of over 500 genera and about 1,300 species.

The Botanical Index, July.—Published by L. B. Case, Richmond, Ind. This is an eight page quarterly devoted to the interests of florists. This number contains a discussion of Lawns and Lawn plants.

BOTANICAL GAZETTE.

Vol. 2. OCTOBER, 1877. *No. 12.*

VARIATIONS OF COLOR IN FLOWERS.—Botanizing recently with some friends on the Malden Highlands, (Mass.), we found a pure white variety of *Gerardia tenuifolia*. The color was clear and distinct, and as the plants were growing with the purple-flowered, without any intermediate tints, it seemed to be a remarkable instance of transition from a primary to another, and an extremely different color. Further on, however, we found one purple-flowered plant with a single branch bearing white flowers with a single large purple blotch on each of the lower petals, being a very pretty sport.

More recently, on going over the same ground alone, I found plants with the flowers all pure white, and plants with the flowers all variegated purple and white.

As I have not before met with such a variation in this species, and do not recall any mention of it, I thought it might be of sufficient interest to make a note of, merely as another instance on the part of certain colors to vary to white, and in connection with it offer the following notes:

Some flowers that vary to white pass through a certain transition of tints from the formation of the bud until the full expansion of the flower, before becoming pure white, while others are white from the first starting of the bud. In the former instance the flowers on being pressed return to what we might call the bud color, and retain that color when dry. In the latter instance the flowers remain white after being pressed, and becoming dry. In the case of the Gerardia, I find that all the flowers that were white, when fully expanded remain white after being pressed, showing no transition of tints in their development.

There is a very pretty rose-colored variety of this species of Gerardia that not only retains the color of its flowers on being pressed, but, also, retains the color of its stem and foliage, instead of turning black like the normal condition of the species. This appears to be the case also with the white variety that I have now pressed.

It is not always the case that a change of color in a flower is an improvement, but this little white Gerardia pleases me even more than the purple.

We have in Massachusetts one of the most beautiful flowers in all the floral kingdom—the charming *Sabbatia chloroides*. The exquisite tint of this lovely flower is something that escapes description. To call it pink, rose color, or rose pink, as is sometimes done, does not seem to me to express it at all, and certainly does not give any idea of the beautiful markings that encircle the base of the petals. But this indescribable tint, with the most delicately-faint, but deliciously-sweet odor, that is scarcely perceptible in a single flower, but which, when the flowers are gathered in a bunch and placed in a vase, will gradually fill a room with a perfume even more delicate, and no less sweet than that of the wild rose, combine to make this gem of midsummer an object of admiration to all who see it.

I have introduced this notice of it here in order to mention a white variety that also grows with us, but which, to me, is interesting only as a novelty that serves, by way of contrast, to make the superior beauty of the other still more conspicuous.

This white variety, however, is peculiar in the transition of tints that it undergoes in expanding its flowers. The bud, and half-opened flowers are of a pale lavender color which gradually fades out until it becomes white in the fully expanded flowers; these white flowers again on being pressed, return to the lavender tint which they continue to retain on becoming dry.

Perhaps the most remarkable instance of a flower varying to white is that of *Lobelia cardinalis*; but the white variety is certainly no improvement on the primary color. The glory of the Cardinal flower is in its intense flaming scarlet that oftentimes lights up the dark ravines as with torches of fire, and this glory vanishes just in proportion as the color changes into rose, white, or as I once found it, variegated white and red The white variety is interesting as a novelty, and retains its color on being pressed. The stems, too, are not so dark and purple as the stems in the other, and the whole plant is much lighter colored.

Blue, pink and purple colors frequently vary to white; yellows seldom. But Mr. Faxon mentioned finding a white variety of *Impatiens pallida*, which on being pressed, returned to the pale yellow color of the species.

These notes might be extended to considerable length, but I have already, I fear, trespassed too much on your space.—Geo. E. Davenport, *Boston, September*, 1877.

Note.—Since writing these notes, a lady who has found a white variety of *Mimulus ringens*, tells me that she has also found the white variety of *Gerardia tenuifolia*.

Notes by C. F. Austin.—Erpodium biseriatum (?)*Lejeunia biseriata*, Aust. *in Proc. Phila Acad. for March*, 1869, *p.* 225. Stems (so far as is known) less than ¾ of an inch long and simple, sub-julaceous when dry, resembling short simple stems of *Frullania squarrosa*. Dorsal (or lateral) stem-leaves broadly ovate-oval, convex, very obtuse, imbricated, succubous, convolute-appressed when dry, widely spreading when moist, reddish or fuscous brown, entire, minutely and closely papillose, the whole lower margin strongly recurved; areolation composed of small opake roundish or oval cells, which are enlarged in the centre towards the base of the leaf, while those on its margin are somewhat translucent. Ventral leaves much smaller (about ⅓ as wide and ⅔ as long) and stipule-like, linear-oblong, plane, attached diagonally to the stem opposite the base of the dorsal leaves, erect-divaricate. Flowers and fruit unknown. Rootlets stout, brown, simple, jointless, proceeding from the base of the ventral leaves (always?). (Georgia, Sullivant.)

In *E. Domingense*, Brid. (Cuba, Wright), the ventral leaves are nearly as large as the dorsal ones, which latter have a somewhat lingulate apex. Perichætial leaves not 4-ranked. Calyptra conic-campanulate, covering about ½ of the capsule. Peristome of a few imperfect ciliæ-like teeth, inserted within the mouth of the capsule. Monœcious male; flower eparaphysate.

Hypnum (Harpidium) Jamesii, *n. sp.*—Compacte cæspitosum; caule fragili erecto subflexuoso remote innovandi ramoso vel simplici, foliis subhomomallo-uncinatis valde concavis lanceolatis attenuato-acuminatis basi sensim angustatis margine integerrimis (nonnullove obscure serratis), costa basi lata crassiuscula in medio sensim defluente cellulis mediocriter magnis lineari-fusiformibus rectis vel subflexuosis, basilaribus infimis multum brevioribus vix latioribus, auricularibus perpaucis subinflatis demum badiis; flores et fructus ignoti. White Mountains, New Hampshire, *James*.

Having diligently compared this moss with all the species of *Harpidium* known to me without being able to identify it, I have reluctantly concluded to describe it as new. It resembles in size and somewhat in appearance *Hypnum fluitans* var. *turfaceum*, while in its subsimple stems it is much like *H. revolvens*; but the former has the leaf of a totally different texture, serrate at the apex, etc., and the latter has a longer more circinnate leaf with narrower cells (but a somewhat similar costa). *H. vernicosum* is a much branched species with a similarly shaped leaf, but the cells, as in *H. revolvens*, are closer, those at the base not at all inflated, costa narrower and thinner, etc.

A form of *H. uncinatum*, with *leaves perfectly estriate*, occurs in great abundance in the Alpine region of the White Mountains. The inflorescence of this species is polygamous. Mr. Peck has collected a form of this species in the Adirondack (without

fruit) of a *dull green color*, and with *estriate erectish* only slightly curved leaves. (*Hypnum Peckii*, Aust. *in litt.* olim.)

Hypnum fluitans occurs near Closter, with an abortive female flower on the distinctly pedicelled male flower, in the axil of a lower perigonial leaf. These (female flowers) are composed of a few minute leaves enclosing from 1–3 pistils and several short paraphyses. This species is readily distinguished when fertile by the broad, very abruptly pointed peri-chætial leaves. It sometimes roots from the apex of the stem leaves. Slender forms often have the leaves obtuse.

Hypnum exannulatum, Gumb. var. Cochleæ. Caule stricto rigido parce diviso interrupte valde ramoso, foliis erectis purpureo variegatis apice pro more integerrimis in siccis parte superiore spiraliter tortis, basi sensim paulo angustata distincte serrata, cellulis infimis plerumque serie singula transversa inflatis.—*Dichelyma Swartzii*, S. & L. *Exsic. Ed.* 2., *n.* 344, planta Californica. Var. immersum.—Caule tenui debili, foliis circinnato-falcatis tenuis perangustis, basi ut in præcedente, apice distinctius remote serrato.—*Dichelyma Swartzii*, S. & L. l. c., planta Novæ Cæsarensis. Var. Swartzii.—Foliis hamato-incurvis rigidis (subserratis) basi solidioribus, cæteroquin ut in præcedente.—*Dichelyma Swartzii*, Lindb!

Hypnum exannulatum is nearest to *H. fluitans*, from which it may always be distinguished by the narrower, much less abruptly pointed perichætial leaves, by the stem leaves gradually more or less narrowed toward the base, more or less distinctly serrate on the margin throughout (only serrate at the apex in *H. fluitans*), with much enlarged and inflated cells at the basal angles or extending across the base. Sometimes these inflated cells occur only at the basal angles, where they form a distinct large patch, and sometimes they extend across the whole base of the leaf *in the same example*. The plant is also dioecious; but I have always found the male and female plants mixed in fertile examples.

Hypnum vacillans, Sulliv., *Icon. Suppl.*, is a form of *Hypnum riparium*, Hedw., (no doubt), with the leaves often obtuse. I have found a large form (sterile) in running water, and resembling a *Fontinalis*, with the leaves all obtuse.

Hypnum fluviatile, Swartz, is certainly only a form of *H. oligorrhizon*, Gumb., which is a form of *H. orthocladon*, Beauv., which is a form of *H. serpens*, Linn. These forms clearly depend upon external causes—as matrix and climate—for the development of their peculiarities. The same may affirmed of all the other forms of *H. serpens*, as *H. radicale*, Brid., *H. irriguum*, Wils., *H. noterophilum*, S. & L., etc. In fact, so far as I have observed, *there is no such thing as variety among any of the cryptogams*, in the sense in which the term *variety* is applied to phænogams; none of them having the power to reproduce their peculiarities under a change of matrix or of climatic influence.

An Explanation.—A remark made by Mr. N. Coleman in the July number of the Gazette, really calls for an explanation on my part. He says "there must be some mistake!" We admit it, and a very unfortunate mistake for the credit of our State Flora, on the part of the authors of our Catalogue, who report only 979 plants, while our whole number must be twice as many! This came from not consulting Drs. C. C. Parry, Davenport; G. E. Ehinger, Keokuk; P. J. Farnsworth (Medical Professor at Iowa University, residence Clinton), and other older botanists. Many plants reported by me were collected from five to eleven years ago, and only now reported to rectify the deficit in said Catalogue. Nebraska reports 2,022 plants, and surely our good state, after all due allowance for the drift by long rivers from far western mountains of a host of their rarest flowers, ought not to fall behind by the thousand! I would, therefore, request that Mr. N. Coleman, Dr. C. C. Parry, and those above named, would send to the author of our Catalogue, Mr. J. C. Arthur, Ames, for copies and fill up the deficiencies in the

columns of the GAZETTE, giving dates and peculiarities, and so great good would grow out of this apparent evil.

One mistake of the authors of our Catalogue is to deny many of our clearest, admitted species. Thus they reject our beautiful *Tradescantia rosea*, *Rosa lucida*, *Panicum amarum* and *Carex varia*, holding that the latter is "merely an upland form of *Carex Pennsylvanica*,"—quite unfortunately, as both species *grow together* on upland or lowland indifferently! The season is not half over, but by a very fruitful visit of three weeks to Lyons, Clinton and Cedar Rapids, I have a score of rare and valuable plants to add to said Catalogue, which will be sent for verification, with the Report, to the editor of the GAZETTE, so as to preclude all doubt. Five of these occur in Ames, viz: *Euphorbia polygonifolia*, L., July 22, College and cemetery; *Euphorbia herniarioides ?* Nutt., August 9, cemetery (not quite ripe); *Iva ciliata*, Willd., from Ames to Nevada, August 14; *Potamogeton lucens*, L. var. ?*fluitans*, Gray, Moses' farm, two miles east of Ames, deep slough now nearly dry, growing in mud, submersed leave gone, July 31; with *Artemisia Canadensis*, Michx., Ames, 1876, abounds from College farm to Tama City, on gravelly banks, roadsides. It occurs no further west. To which may be added a beautiful specimen of *Pentstemon Cobaræ*, sent at my request from Crescent City, Iowa, by H. H. Terry, who deserves great credit for its introduction from Nebraska, with other rare plants.—R. BURGESS, *Ames, Iowa.*

PURE WHITE VERBENA STRICTA.—This summer I found five pure-white specimens of *V. stricta* growing near each other. About forty rods from these were three others—perhaps seedlings of the first. Eight miles from this locality one plant was found, and twenty miles from the five first discovered three others were seen. The points of interest in regard to them were their wide distribution considering their rarity, their being surrounded by numerous specimens of the usual color, no pale intermediate forms being near, and in three cases out of the four, where there was more than one plant in a place, they grew close together, not being interspersed among the blue. Five roots were examined to see if they suckered, but no such connection was found. No difference in structure was observed between the white and the blue, excepting that the flower spikes were more slender and pointed in the white than in the blue.—J. M. MILLIGAN, *Morgan county, Ill.*

IS HELIANTHUS LÆTIFLORUS A GOOD SPECIES?—I have had reason to doubt whether this sunflower is a distinct plant. According to Gray's Manual, it has *yellow* disk flowers and *acute* involucral scales, "the leaves almost as thick as in *H. rigidus*," while the latter is said to have *purple* disk flowers and *obtuse* scales. I can see no other difference between the species, in the descriptions. Now, our *H. rigidus* usually has *acute* scales, (it is so described in Chapman's Flora!) and I have found near Oquawka, this season, several plants of this species with a *yellow* disk. The leaves vary greatly in size and shape, on different plants, from broadly ovate to almost linear, always thick and very rough. The color of flowers is, I think, of small importance. Mr. Bebb has found the allied *Rudbeckia hirta*, (usually purple), with a yellow disk. Will some one who believes in *H. lætiflorus*, defend that species and send me a specimen?—H. N. P., *Box* 16, *Oquawka, Ill.*

SOME NYMPHÆAS.—Dr. H. C. Beardslee, of Painesville, O., writes as follows: "A young lady of this place brought me, last week, a specimen of *Nelumbium luteum*, Salisb., collected in Bass Lake, a small inland lake, 12 or 15 miles south of this place and on the highlands 18 or 20 miles south of the lake shore. The locality was a surprise to me. The same lady informs me that she found a *Nymphæa* with pink flowers, not fragrant. Our white pond lily is *N. tuberosa* of Paine, which is said by Gray, in the Manual, never to have *pink* flowers. Either *Nymphæa odorata* occurs in that pond, which I can scarcely believe, or the petals of *N. tuberosa* are sometimes pink, or in the

third place, the two may not after all be specifically distinct. A lady from Milwaukee tells me that fragrant white pond lilies occur near that place."

MEGARRHIZA.—Since receiving the August number of the GAZETTE, I have been on the alert for *Megarrhiza*, being fully determined to find it if it grew in the county of Sonoma. For three days I looked for it upon the bushes on Fitch Mountain. The next day, however, I descended the Russian river in search of a corn field, in which I remembered the *Sicyos angulatus* to have particularly flourished in the East. About a mile and a half from Healdsburg, on the right bank of the river, we spied the looked-for corn field, and carefully stepping to the top of the high picket fence enclosing the field, we perceived that the back fence was at intervals covered by a closely matted, brown-colored vine. Hastening across the field we grasped the dried fruit of *Megarrhiza*. After a long and tedious search we obtained some fifteen seeds, corresponding to the description given by Dr. Gray. There are four seeds of an almond shape contained in a thorny obovate fruit. The fruit being very ripe, the seeds had generally fallen and had been devoured by the rats.

Desiring to satisfy ourselves that it was surely Megarrhiza, we began with our botany knife to search for the root. Having followed a vine into the ground to the depth of 18 inches, we pressed into service a "small boy," who was curiously eyeing our movements. Securing a long handled shovel we continued our downward career. At the depth of 21 inches we came to the top of the rootstock; an *hour* later we had come to bed rock and were hauling the stock to the surface. This I carried home and will give the measurements: weight, 18 lbs; length of main root, 2 feet 10½ inches; circumference at the top, 21½ inches; circumference one foot from base, 15½ inches; shape, for 20 inches nearly cylindrical, then fusiform. Depth of hole, from top to bottom, 55½ inches.—R. H. THOMSON, *Healdsburg, California.*

THE "BARRENS" OF SOUTHERN INDIANA.—Ever since the writer had the privilege of arranging Dr. A. Clapp's botanical collection, made principally in 1836–1839, and discovered many desirable plants labeled "Barrens," these barrens have been often in his mind as one of the most desirable localities in Indiana for the botanical collector. At last the trip has been made, the Barrens explored, and we lay the results before the readers of the GAZETTE. The Barrens are of considerable extent, occupying quite a large area in the corners of four counties, Clarke, Floyd, Washington and Harrison. All over this region the drainage is effected by "sink-holes," not a stream, rivulet, or a single drop of running water appearing at the surface. The country is very rolling and in the bottom of each depression are found from one to three "sink holes," sometimes full of water, at others mere filthy mires, or empty. The surface is a mass of flinty stones and concretionary boulders, "nigger-heads" as they are called. The result of this flinty soil and absence of surface moisture is plainly shown in the vegetation. Scattered all over this area are thickets of scrub oak and small shrubby undergrowth, separated from one another by natural openings where, so far as we could judge, no tree or shrub had ever grown. It was in these open places that we found our best species. A trip through the Barrens is a disappointing one, for although one can secure many valuable prizes, he is constantly grieving on account of the ravages of civilization. When Dr. Clapp collected his specimens here forty years ago, it was no doubt a perfect wilderness, but now settlers have come in, a German population has taken possession of the Barrens, and our natural openings are made to yield some of the finest wheat in the State. Instead of the gorgeous display of rare and beautiful flowers, which cover the ground profusely wherever they have been left standing room, we see the monotonous succession of fields of grain or stubble. Even the fence corners are kept scrupulously clear of "weeds," for your German farmer cares nothing for science if it chokes up his fence rows. In the fields of one farmer, however, the weeds had the start, and there we found some good species, such as *Liatris scariosa*, Willd., *Eupatorium sessilifolium*, L.,

Brachychæta cordata, T. & G., *Solidago rigida*, L., *S. nemoralis*, Ait., *Silphium trifoliatum*, L., *Echinacea purpurea*, Moench, *Rudbeckia laciniata*, L., *Lepachys pinnata*, T. & G., *Helianthus mollis*, Lam., *H. rigidus*, Desf., *H. microcephalus*, T. & G., *H. hirsutus*, Raf., *Coreopsis tripteris*, L., *Dysodia chrysanthemoides*, Lag., *Stylosanthes elatior*, Swartz, *Desmodium rotundifolium*, DC., *Lespedeza procumbens*, Mx., *Tephrosia Virginiana*, Pers., *Phaseolus helvolus*, L., *Eryngium yuccæfolium*, Michx., etc. Enough has been given to show the general nature of the species. We were there in that most unfortunate time, that could be called the resting season, when all the spring and early summer flowers have disappeared and the fall flowers have not yet begun to show their brilliant blossoms. All along over the Knobs, on the way to the Barrens, we encountered any quantity of *Croton monanthogynum*, Michx., in beautiful condition for specimens. *Dysodia* was hardly absent from the roadside for thirty miles, and its fragrance came to be one of the accompaniments of the landscape. It is to be hoped that a trip later in the fall will bring back fresh specimens of many more desirable species.—J. M. C.

Zanthoxylum Americanum, Mill.—A few days since while hurrying through the woods my attention was called to a small cluster of trees bearing *bright red* berries, to all appearances. On nearing it I found it to be *Zanthoxylum*, or Prickly Ash, and noticed at once the air was filled with a delightful fragrance as of fresh lemons. By a little pressure of the pods, which I found upon closer examination to have an oily look and to vary in color from a *greenish yellow* to a *bright red at maturity*, I soon found my fingers covered with an oil so volatile that it was hardly expressed until it was gone. However, I had found the source of the pleasant odors that were filling the air. My curiosity led me one step further, and that was to taste the fruit. I knew it was medicinal, but I was hardly prepared for the revelations of the next moment, for as I began to chew, it began to take good hold upon my tongue, mouth and lips, and such a burning dryness as I had for the next half hour I have never before known. Water only seemed to add fuel to the flame which thus carried its stimulating effects further down. As a result of this experimental knowledge I would heartily approve of the name "Toothache-tree," for he who dares to chew the green fruit will soon have little time to think of his previous pains. These bushes with their brilliant fruit, sightly foliage and exquisite fragrance, certainly invite cultivation.—A. H. Y.

Curious Dissemination.—For two years I was baffled in my efforts to gather seed of the beautiful *Leucocrinum montanum*, abundant in Sierra Valley, but rare elsewhere in California. During the first season I found how oddly the pericarp remained down in the ground, though the large, creamy white flower was exserted two or three inches above it, but not until too late to save seed at the close of the second season did I discover *how* the shining black seeds were spirited away.

The *Leucocrinum* is a Liliaceous plant of the fibrous-rooted kind, and acaulescent. Its grass-like leaves, ½ inch wide by 4 to 6 long, rise from a caudex sessile upon the roots, an inch or more below the surface of the ground. As inferred, the pericarp is short stipitate, and matures its seed at a locality in the ground, to be sure, but quite unfavorable for successful rooting, since, when the pericarp bursts, the seeds are discharged upon a spot already occupied by the perennial parent plant; that is, it would *seem* that they are thus left to fate, but when the spot is searched after the plant ripens and its leaves are gone not a seed remains in place. *They are carried away by the incurved bases of the withered leaves, and blown with them by the wind over the plain.*—J. G. Lemmon.

Plants for Sale.—Mr. Geo. D. Butler, of Almont, Iowa, has several sets of southwestern plants to sell, containing very rare species, as for instance, *Selenia aurea*, Nutt., *Stellaria Nuttallii*, T. & G., *Tephrosia onobrychoides*, Nutt., *Acacia hirta*, Nutt., *Rosa foliolosa*, Nutt., *Gaura Sinuata*, Nutt., *Trepocarpus Æthusæ*, Nutt., *Apium Popei*,

Gray, *Fedia Nuttallii*, T. & G., *Engelmannia pinnatifida*, T. & G., *Monarda Russelliana*, Nutt., *Andrachne Raineriana*, Muller, *Spiranthes cernalis*, Eng. & Gray. They will be sold in sets of 100 species for $10. The species have been named by Dr. Engelman.

Mrs. M. E. P. Ames, of San Jose, California, has sent to this office a limited number of sets of California plants to be sold. The Editor has examined the plants and can recommend them as being exceedingly desirable species. They are put up in sets of 50 species for $5.00. Any botanists desirous of securing these specimens will address the office at Hanover, Ind.

Mr. C. G. Pringle, of Charlotte, Vt., offers for exchange or sale a few sets of the Alpine Plants of New England, the fruit of his extensive herborizing during the past summer in the White and Green Mountains. Mr. Pringle's collections contain *Gentiana Amarella*, var., *acuta* (American Naturalist, Vol. XI., p. 620), *Anemone multifida*, *Astragalus. Robbinsii*, *Gnaphalium supinum*, *Orchis rotundifolia*, *Danthonia compressa*, and nearly all the other rare plants of his region.

American Naturalist, September. Byron D. Halsted has an illustrated paper on "Reproduction in Fresh-Water Algæ." He points out a few of the methods of asexual and sexual reproduction, and shows that the often supposed sameness of reproduction in these plants of low grade is lost in an endless variety of methods and changes. In an article on "Violets," is given a preliminary sketch of the literature in reference to the two kinds of flowers so often observed in many of the species of violet. In many species flowers appear in summer entirely unlike the more showy ones of early spring. Flowers of this kind have long been known, but they need to be more carefully examined with reference to their specific peculiarities. The object of the present sketch is the hope that some of our botanists may collect and study these forms. The first observations recorded of flowers of this kind were in 1732, by Dillenius and Linnæus, in the case of *Viola mirabilis*. Several interesting extracts with reference to this subject are given from the *Botanische Zeitung*. Some botanists have even suggested that the species of violets may be distinguished by the characters of the late flowers.

Bulletin of the Torrey Botanical Club, August.—Dr. Thurber gives an interesting notice of "An Orange within an Orange." He says "the genus *Citrus* appears to have a remarkable tendency to produce abnormal forms, and probably affords writers on vegetable teratology more illustrations than almost any other." Dr. J. F. Joor, of Harrisburg, Texas, makes an interesting observation on *Callitriche Nuttallii*, Torr. He finds that the supposed rooting from the joints of the prostrate stem a mistake, but that "after the flowers are fertilized, the peduncles lengthen, at the same time turning downwards, until the little nutlets, characteristic of the genus, are forced quite beneath the surface of the moist earth. If collected at this time, the peduncles appear like roots, bearing little tubers at their ends." Mr. Leggett has found that *Pontederia cordata* is trimorphic. Of the three kinds of flowers, "one has the stigma raised on the style to the top of the flower, a second only to the middle of the flower or top of the tube, and the third with a very short style at the bottom of the tube."

Gardner's Monthly, September. This journal is always full of valuable and seasonable information for horticulturists and botanists in general. This number contains quite a long and very readable communication from the editor entitled, "European Notes."

Mr. Darwin on the Fertilization of Flowers by Thomas Meehan.—This is a review of Mr. Darwin s work on "Cross and Self-Fertilization in the Vegetable Kingdom." Mr. Meehan gives Mr. Darwin unbounded praise for his patient, laborious work, but he does not draw the same conclusions from the same facts, and believes that there is infinitely more self-fertilization among flowers than advocates of insect agency have been contending for.

Woods and Woodlands, a Lecture by Prof. Wm. H. Brewer, is from the Report of the Secretary of the Conn. Board of Agriculture, 1876, and is an able appeal for the more careful preservation of our forests. It also gives valuable instruction in regard to the best trees for planting and other matters pertaining to timber.

Observationes Lichenologicæ, No. 4. Observations on North American and other Lichens, by Edward Tuckerman, M. A. From the proceedings of the American Academy. Prof. Tuckerman in this contribution describes about thirty-five new species of lichens, and in an appendix gives a little notice of the Kerguelen lichens. It seems that Rev. J. M Crombie, in publishing a note on "New Lichens from Kerguelen Land," collected by the British Transit Expedition, and determined by Dr. Nylander, paid very little regard to the previous determination and naming of certain species by Prof. Tuckerman, and when notice of them was taken at all, it was in a way that seemed unkind, to say the least about it. Prof. Tuckerman makes a manly statement of the facts, frankly acknowleding the superiority of the British collection and any mistakes that he may have made, but contending strongly for points in which he thinks himself right.

In closing Vol. II. of the *Gazette*, we make the following announcement for Vol. III.:

The *Gazette* will continue for the ensuing year under the editorial management of JOHN M. COULTER and M. S. COULTER. Encouraged by the success of the past years, we desire to make the *Gazette* a *necessity* to Botanists.

In Vol. III. the leading articles, when needful, will be illustrated, in the hope that a greater interest and attractiveness may be added to our pages. Its object, as heretofore, will be to afford a rapid and convenient means of communication among Botanists. Thanking the Botanists of the country for their uniformly kind expressions in regard to the *Gazette*, as well as for the material which they have furnished us, we respectfully ask them to aid us again in our enterprise—both by notes and subscriptions

Our list of contributors, containing a large number of prominent Western Botanists, gives promise of much new material from that region of country.

It has been thought best to begin Volume III. with the year, as our subscriptions are nearly all arranged in that way, thus breaking into two volumes. No. 1 of Vol. III. will appear about the middle of December.

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BOTANICAL GAZETTE.

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THE SPECIES OF ISOETES OF THE INDIAN TERRITORY.—ISOETES MELANOPODA, J. Gay, originally found in central and northern Illinois, then in the neighboring regions of Iowa, seems to be peculiar to a belt of prairie country extending from northeast to southwest, from Illinois to Iowa, the Indian Territory and Texas. Mr. E. Hall, who discovered the species in Illinois, found it also some years ago in Dallas county, Texas, and now Mr. G. D. Butler sends it from the Indian Territory. However the other characters may vary, the macrospores everywhere readily characterize the plant. They are the smallest of any of our species, but varying in the same sporangium, between 0.25 and 0.35 mm., very rarely as much as 0.40 mm. in diameter, marked with confluent knobs and curved and twisted (worm-like) low, sometimes almost indistinct, elevations, visible, of course, only under a strong magnifier. The velum or membranaceous fold, which more or less completely covers the spore case, or is, rarely, wanting, is in this species usually narrow, or sometimes wider; in the southern forms it covers about one-third of the upper half of the sporangium. Full-grown specimens are ½-1 inch in diameter at the almost black and shining base of the leaves; these, smaller and fewer in the northern forms, are in the southern ones 20-50 in number and 8-12 inches in length, and, as I have described them in Gray's Manual, triangular, with 4 peripherical fibrous bundles and with numerous stomata.

ISOETES BUTLERI, *n. sp.*—I name an allied species discovered by Mr. Butler, near the latter, in drier soil, a much smaller plant with earlier (beginning of June) maturity. It is at once recognized by its larger macrospores, 0.50–0.63 mm. in diameter, marked with distinct knobs or warts, which rarely run together. The base of the plant is only ½ inch thick, the slender leaves with dull whitish bases, only 8-12 in number, are 3-6 or 7 inches long, of exactly the same structure as those of the last species. Velum very narrow or almost none. Microspores aculeolate in both, in the latter species a little larger than in the former.

The species of Isoetes are usually, as is well known, monœcious, the exterior sporangia bearing female or macrospores, the interior, later developing ones, male or microspores. But *I. melanopoda* is oftener diœcious than monœcious. Mr. Butler examined hundreds of specimens and found about one-third monœcious and two-thirds diœcious, and of these the male and female plants in about equal numbers. Of *Isoetes Butleri* he never could find a monœcious plant; all the specimens which he found as well as those which I examined, were diœcious, both sexes in about equal numbers.—G. ENGELMANN, *St. Louis, Nov.* 1877.

To the foregoing description by Dr. Engelmann I append some remarks in regard to the locality in which these plants occur. Both were found near Limestone Gap on the Missouri, Kansas & Texas railroad, about 70 miles north and 100 miles west of the Texas and Arkansas boundaries, near the divide between the Red and Arkansas rivers. The surface of the country is very rough, woods and prairies alternating and of about equal extent. There is a clay underlying most of the country. Many wells and springs running into or passing through this clay are damaged or sometimes rendered unfit for use by the quantities of sulphates of magnesia and soda entering into solution therefrom. Occasionally this clay arises to the surface, forming low, level places, which are popularly known as alkaline flats, but which I call "sulphate flats," these sulphates

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often occurring in a thin efflorescence on their surface. During winter and spring, while the rainy weather lasts, the sulphate flats, owing to their level surface and imperfect drainage, are very wet, but by or before the first of July, when the dry summer has well begun, they have become the dryest of all dry places, for the clay prevented the water from soaking in, and the soil is so thin that an adequate store of moisture could not be laid up. What in early spring was the home of moisture-loving species, has in summer a coat of such species as *Iva angustifolia*, and *Ambrosia psilostachya*; but even these are matured earlier and are smaller on the sulphate flats than elsewhere, owing probably to their dryness. Even *Opuntia Rafinesquii* grows on the flats, but it, too, has an unhealthy dwarfish appearance, though for a different reason, as I take it; it must have been for it such a great effort to endure the protracted drenching in winter and spring. These sulphate flats are the home of *Isoetes Butleri*. It disappears between the middle of June and the first of July. It grows with *Plantago pusilla*, *P. Patagonica*, var. *aristata*, *Polygala verticillata*, *Arenaria Pitcheri*, &c. There are occasional basins in the flats which contain more or less water, and here *I. melanopoda* grows. It also occurs in nearly all pools, ditches and wet weather streams. It is much more common than the other, or at least appears so, as it is so much easier to find, owing to its greater size, and paucity of companions. It disappears in August. Neither species will do well if shaded.—Geo. D. Butler, *Almont, Iowa.*

An enumeration of some plants—chiefly from the semi-tropical regions of Florida—which are either new, or which have not hitherto been recorded as belonging to the Flora of the Southern States. By A. W. Chapman.

Anona glabra, L. Smooth; leaves sub-coriaceous, oval or oblong, acute, entire; peduncles short; petals thick and fleshy, ochroleucous, reddish within, the outer ones etliptical, the inner ones smaller, lanceolate; fruit smooth, globose or sub-conical, many-seeded; seeds oblong, compressed.—Banks of the Caloosa River, and near Miami, (Dr. Garber,) South Florida. June, fruiting in November.—A tree 10–30 feet high. Leaves, 3–5 inches long. Flowers, 1½ inches wide, fragrant.

Nymphaea flava, Lutres. A notice of this yellow Pond Lily is contained in Harper's Magazine for August, 1877. I have not seen the plant.

Cypselea humifusa, Turp. Annual, smooth, succulent; leaves opposite, obovate; the petioles dilated into a lacerated stipule-like membrane; flowers axillary, minute, sepals obtuse, greenish within; petals none.—South Florida, *Dr. Blodgett* in Herb. Gray.

Malva parviflora, L. Stem stellate-hairy, the branches decumbent; leaves round-cordate, obtusely 5-lobed, crenate-serrate, downy, half as long as the petiole; flowers single or clustered, pale rose-colored; carpels deeply pitted on the back, the sides rugose. Waste places, Apalachicola. Introduced.

Malvastrum spicatum, Gray. Stem stout, branching, hairy; leaves on long petioles, ovate, acuminate, crenate, tomentose beneath, the lower ones cordate; flowers small, in dense axillary and terminal spikes or clusters; involucel 3-leaved, as long as the very hairy calyx, and the obliquely obcordate yellow petals; carpels 10–12, smooth, awnless. Apalachicola. Introduced. Stem 2–4 feet high.

Sida cordifolia, L. Tomentose; stem tall, branching; leaves cordate-ovate, entire, or angularly 3-lobed, crenate-serrate; flowers small, axillary, the upper ones crowded in a dense compound raceme; carpels 10–12, shorter than the two slender retrorsely scabrous awns.—Waste places, Cedar Keys, Florida. October. Annual. Stem 3–5 feet high. Leaves 2–3 inches long. Flowers ½ inch wide.

Pavonia spinifex, Willd. Shrubby, hirsute; leaves on long petioles, oblong-ovate, mostly cordate, serrate; peduncles mostly longer than the petioles; leaves of the involucel 8, lanceolate, longer than the calyx, shorter than the yellow corolla; carpel trispin-

nous —Charleston, S. C., (*Rev. Dr. Bachman* in Herb. Durand.) Stem 3–5 feet high. Flowers 1 inch wide.

Urena Ribesia, Smith. ? Stem stout, much branched, tomentose; leaves roundish sub-cordate, obscurely 3–5-lobed, whitish beneath, with 1–3 glands at the base of the ribs; flowers axillary, and crowded in a terminal raceme; involucel with 5–7 subulate lobes; corolla 3–4 times as long as the calyx; carpels 5, densely spinous.—South Florida. October. Annual. Stem 2–4 feet high. Flowers pale rose color.

Fugosia heterophylla, Vent. Smooth; stem angular, branching; leaves lanceolate or oblong, rarely obovate and 3-lobed, 3-nerved, the margin entire; flowers axillary, solitary, the long peduncles thickened under the flower; involucel of 8 or more minute subulate leaves; calyx dotted with black, the 3-ribbed acute lobes much larger than the tube; petals truncate; style clavate; capsule 12-20 seeded, the seeds woolly.—Lignum Vitæ Key, South Florida. Perennial. Stem 12–18 in. high. Flowers yellow, 1½ inchs wide.

Hibiscus coccineus, var. *integrifolius*. Leaves ovate, acuminate, undivided, or the lowest slightly 3-lobed.—Marshes near Jacksonville, East Florida.

Riedlia serrata, Vent. Somewhat shrubby, hairy; stem branching, slender; leaves ovate, unequally serrate, acute; stipules linear, longer than the petioles; flowers axillary, mostly clustered, the upper ones forming a terminal interrupted spike; involucel 3-leaved, subulate, much shorter than the petals.—Banks of the Caloosa River, South Florida. October. Stem 2–5 feet high. Leaves 1 inch long. Corolla 1 in. wide, purple.

Riedlia hirsuta, DC. Stem pubescent and slightly muricate, much branched; leaves ovate, subcordate, acute, smoothish, crenate serrate; stipules subulate, many times shorter than the petioles; flowers in dense terminal clusters; involucel setaceous; corolla small, pale rose color, yellowish within; filaments half united.—Waste places, Savannah, Georgia (*Dr. Feay.*) September. Annual. ? Stem 1–3 feet high. Leaves 2–3 inches long. Flowers ⅓ inch wide.

Triumfetta semitriloba, L. Hirsute, much branched; stem slender; leaves round-ovate, acuminate, serrate, entire or angularly 3-lobed; flowers clustered, axillary and terminal, the pedicels 3-flowered; sepals apiculate, as long as the wedge-shaped petals; stamens 10–15; capsule globose, bristly.—Waste places, Manatee, South Florida, (*Dr. Feay.*) Stem 3–4 feet high. Leaves thin. Flowers small.

Schœpfia arborescens, R. & S. Leaves ovate-lanceolate, entire; peduncles axillary, 1–3(mostly 2)-flowered, dilated at the summit into an angular receptacle; calyx truncate, entire; corolla bell-shaped, 4–5-lobed; stamens 4–5, opposite the lobes, partly adnate, ovary 2–3 celled.—Banks of the Caloosa River, South Florida. October. A small tree with smooth, flexuous, brittle branches. Leaves 2–3 in. long. Flowers small, greenish, Fruit not seen.

Vitis (*Cissus*) *sicyoides*, L. Pubescent; leaves undivided, ovate, cordate, acute, finely and sharply serrate; cymes small, shorter than the leaves.—Banks of the Caloosa River, and at Palm Cape, South Florida. November. Stem long; the branchlets and leaves succulent. Berry globose, of the size of a currant.

Picramnia pentandra, Swartz. Branches smooth; leaflets 5–7, ovate-oblong, entire, opposite or alternate, obtuse; racemes 3–4, slender, drooping, forming a simple terminal panicle; flowers small, single or clustered; stamens 5, exserted; stigmas sessile.—Miami, South Florida, (*Dr. Garber.*) June. A slender shrub, 8–10 feet high. Leaflets 2–3 in. long, distant, smooth and shining. Racemes 3–6 in. long.

Myginda pallens, Smith. Leaves elliptical, very obtuse, crenate, smooth, nearly sessile; peduncles forking, with the middle flower stalked; style distinct, 4-cleft.—South Florida, *Dr. Blodgett*, in Herb. Gray.

Sapindus Saponaria, L. ? Petioles broadly winged; leaflets 6 or 8, mostly opposite, oblong, obtuse, mostly equal-sided, paler and pubescent beneath; panicle tomentose,

hoary.—South Florida. November. A small tree. Panicle loosely or densely-flowered. Drupe size of that of *S. marginata*.

Polygala Rugelii, Shuttleworth. Stem simple, or at length branching above; leaves alternate, lanceolate, acute, sessile, the lowest ones narrowed into a petiole; spikes long-peduncled, globose; wings oblong-obovate, cuspidate; caruncle and seed as in *P. lutea*. Tampa (*Rugel and Feay*). Stem 12–18 in. high. Flowers drying dark brown

Crotalaria maritima, n. sp. Stem low, much branched, pubescent with short appressed hairs; leaves simple, small, oblong, sub-sessile, very thick and succulent; stipules minute and narrowly decurrent, or none; raceme 2-flowered; legume smooth.—Sandy beach at Palm Cape, South Florida. Stem 6 in. high. Leaves 1 in. long. Flowers not seen.

Crotalaria pumila, Ort. Perennial. ? Stem spreading, slender, smoothish; leaves trifoliate, leaflets small, oblong-obovate, emarginate, longer than the petioles; stipules minute; peduncles much longer than the leaves, few-flowered; corolla small, yellow; legume nodding, oval, pubescent. (*C. littoralis*, H. B. K.)—Sandy beach at Casey's Pass, South Florida. October. Stem 2–3 feet long, sparingly branched. Leaflets ½-1 inches long. Legume ½ in. long.

Crotalaria incana. L. Annual, erect, much branched, pubescent; leaves trifoliate, long-petioled, leaflets round-obovate, shorter than the petiole, smoothish, paler beneath; stipules setaceous, caducous; raceme stout, many flowered, the bibracteolate pedicel nodding; keel of the yellow corolla tomentose on the margin; legume oblong, villous. Coast of South Florida from Cedar Keys (*Dr. Garber*) to Cape Romano. October. Stem 3–5 feet high.

Petalostemon roseum, Nutt. Leaflets 3–4 pairs, very narrow linear; calyx smooth, the teeth nearly as long as the tube; petals obovate, rose-color; bracts setaceous, longer than the calyx; otherwise like *P. violaceum*.—Low pine barrens, East Florida.

Lespedeza striata, Arnott & Hook. Stem branched, pubescent; leaves small, leaflets oblong-obovate, mucronate; stipules persistent, scarious, ovate-lanceolate, strongly veined, twice as long as the petioles; racemes 1–5 flowered, shorter than the leaves; calyx veiny, the ovate teeth shorter than the round-ovate reticulate legume; flowers purple. Fields and way-sides, Macon, Ga. (*Dr. Mettaur*, 1865). Now spreading over the Southern States. Introduced from Asia. Stem 6–18 inches high. Leaves ½-1 in. long.

Desmodium triflorum, DC. Stem filiform, prostrate, rooting at the joints, pubescent; leaflets small, obcordate, smooth above; peduncles axillary, 2–3 together, 1-flowered; legume curved, 3–4 jointed, the joints flat, semi-circular.—Waste places, Manatee, South Florida, (*Dr. Feay, Dr. Garber*). Stem 6–12 in. long.

Erythrina Corallodendron, L. ? The tree I saw on the banks of the Caloosa River in October was 15–20 feet high, and 4–6 in. in diameter, without flowers or fruit. The leaves were like those of *E. herbacea*.

Galactia Cubensis, H. B. K. Stem long, twining, villous; leaflets oval or oblong, rarely acute, soon smooth above, silky beneath, rather longer than the villous petioles; racemes curving, longer than the leaves, spicate; flowers approximate, large, purple, the vexillum obliquely striate; legume silky, falcate, compressed, 10-seeded. (*G. spiciformis*, var: Chapm., S. Fl.) South Florida (*Rugel* in Herb. Gray.)—Lignum Vitæ Key. November.

Ecastaphyllum Brownei, Pers. Stem branching, slender; leaflets single, ovate, acute finely pubescent above, paler and velvety beneath, short petioled; panicle cluster-like, axillary, as long as the petiole; corolla small, white; legume orbicular, compressed, 1-seeded.—Banks of the Caloosa River. November. Miami, South Florida. (*Dr. Garber.*) —Shrub 4–8 feet high. Leaflets 3–5 in. long. Legume 1 in. long.

Cassia ligustrina, L. Annual? Smooth, mostly simple; leaflets 10–16, opposite,

lanceolate, oblique at the rounded base, the subulate gland near the base of the petiole, or rarely between the lowest pair of leaflets; racemes short, axillary, the upper ones approximate, few-flowered; sepals obtuse; legume linear, slightly curved, compressed, many seeded.—Sandy coast, from Tampa Bay southward, South Florida. Stem 3–4 feet high. Leaflets 1½-2 in. long. Legume 4 in. long.

Psidium pyriforum, L. (Guava) Branchlets 5-angular, compressed; leaves thick, opposite, oval-oblong, strongly veined, paler and softly pubescent beneath; pedicels axillary, 1-flowered; fruit pear-shaped.—Clear Water Harbor and Southward, South Florida. Introduced. A small tree.

Jussiæa macrocarpa, Vahl. Branches hirsute, leaves broadly lanceolate, acute at each end, hirsute; peduncles barely longer than the 2-bracted club-shaped ovary; calyx-lobes 4, ovate-lanceolate, acuminate, longer than the tube, shorter than the roundish petals; capsule wedge-oblong, obscurely 4-sided, longer than the bracts.—Muddy Banks of the Caloosa River and at Miami, (*Dr. Garber*) South Florida. Shrub 5–10 feet high. Leaves 3–4 in. long. Corolla 2 in. wide.

Mentzelia Floridana, Nutt. This is a shrubby, trailing plant, 3–10 feet long, from Tampa Bay southward.

Viburnum involucratum, n. sp. Leaves small, varying from oblong to broadly ovate, entire, irregularly serrate, or slightly 2–3 lobed, acute at each end, or rounded at the base; cymes small, compact, the base and ramifications involucrate with a whorl of linear spatulate bracts.—Wooded hill-sides. West Florida. April. Shrub 2–4 feet high. Leaves 1–2 in. long.

Richardsonia scabra, St. Hill. Annual, hirsute, the branches dichotomous; leaves thick, ovate, acute, rough above and on the veins beneath, the 2 upper pairs involucre-like; calyx-lobes subulate; corolla funnel-shaped, 3–6-lobed; nutlets 2–3, oblong. (*Spermacoce involucrata*, Ph!)—Southern Alabama, thence spreading throughout the warmer parts of the Gulf States. Stem ½-3 feet long. Flowers white.

Vernonia angustifolia, Michx., var. *pumila*. Stem low (6–12 in.), slender, smoothish; leaves (1–1½ in. long) scattered, flat, lanceolate, entire, or the lowest minutely denticulate; heads 3-7 in an open cyme, pedicellate; involucre purplish, smooth; pappus yellowish; achenium smooth, furrowed.—Wet pine barrens near the Caloosa River, South Florida. October.

Pectis ciliaris, L. Stem erect, branching, smooth; leaves linear, crowded, sub-connate, bristly fringed below the middle; heads linear, nearly sessile; rays 3, pappus of the disk flowers of 5 lanceolate acuminate scales, of the rays 3.—Collier's Key, in Caximbas Bay, South Florida. September. Stem 1 foot high.

Eupatorium suaveolens, n. sp. Stem long, slender, smoothish, branching; leaves small, ovate, tapering to the obtuse apex, abruptly contracted at base, coarsely and unequally serrate, 3-nerved, twice as long as the very slender petioles; corymbs loose, compound, pubescent; heads 12–14-flowered; corolla white, achenium slightly pubescent. Clear Water Harbor and Manatee, South Florida. November. Stem 2–3 feet long. Leaves 1-1½ in. long. Flowers very fragrant. Closely allied to *E. aromaticum*, but with the habit of *E. incarnatum*.

Eupatorium tortifolium, n. sp. Stem erect, slightly scabrous, pubescent, corymbose above; leaves vertical, lanceolate, entire, sub-sessile, 3-nerved, the upper ones linear, alternate; corymb compound, villous; heads large, crowded, 5-flowered; scales of the involucrum linear, acute, villous; achenium smooth; pappus stout, longer than the white corolla.—Dry pine barrens, Decatur county, Georgia. Stem 12–18 in. high. Leaves 1–1½ in. long.

Conoclinium dichotomum, n. sp. Stem smoothish, erect, diffusely dichotomous; leaves opposite, deltoid, barely acute, crenate-serrate, truncate and entire at the base. twice as long as the short petiole; corymbs very numerous, mostly in the forks of the

branches, dense, short-penduncled; heads few (3–10), on short pedicels; flowers blue. South Florida. Stem 1–2 feet high. Leaves 1-1½ in. long. Flowers smaller than those of *C. cælestinum*, blooming, in cultivation, from May until frost.

Ooclinium rigidum, DC. Frutescent at base, closely pubescent; stems numerous, erect branching; leaves opposite, ovate, crenate-serrate, acute, longer than the petioles; pedicels single, or 2–3 together in the forks of the branches, unequal, longer than the cylindrical many-flowered heads; scales of the involucre smooth, closely imbricate, striate, obtuse, decidous; flowers (about 20) pale blue; achenium smooth, 3–4-angular; receptacle globular or truncate, naked.—Jew-fish Key, South Florida. November. Plant 2 feet high, exhaling a strong unpleasant odor.

Acanthospermum xanthioides, DC. Stem prostrate, diffusely branching, pubescent; leaves opposite, oval or obovate, toothed or entire; heads single, terminal and in the forks of the branches, many-flowered; rays yellow; chaff of the receptacle obtuse, unarmed at the tip.—Aiken, South Carolina (*Ravenel*), Atlanta and Savannah, Georgia, Jacksonville and Gainesville, Florida.

Actinomeris heterophylla, n. sp. Stem erect, mostly simple, sparingly hirsute, terete and nearly naked above, the lower part winged by the decurrent leaves; leaves muricate, the lower ones oblong, opposite, approximate, half clasping, serrate, decurrent, the upper linear, opposite or alternate, small (½-1 in. long), remote, entire; heads solitary or corymbose, on slender peduncles; scales of the involucre lanceolate, mostly shorter than the disk, shorter than the 5–10 linear yellow rays; chaff of the receptacle rigid, acute, longer than the obovate narrowly winged 1–2 awned achenium.—Sandy pine barrens, East Florida. Stem 2–3 feet high. Leaves 2–3 inches long.

Flaveria angustifolia, Pers. Stems shrubby at the base, numerous, erect, smooth, branching; leaves thick, lanceolate, acute, remotely serrulate, connate and sheathing at base; corymbs numerous, compact; heads 10–15 flowered, angular, discoid, or with a single oblong or entire ray.—Sand Key, at Clear Water Harbor, Oct. Stems 2–4 feet high.

Palafoxia Feayi, Gray. Shrubby; stem slender, widely branching, roughish with short rigid hairs; leaves ovate and lanceolate, opposite and alternate, longer than the short petioles; corymbs loose, spreading; heads discoid; achenia slender, sparingly hispid, as long as the linear obtuse scales of the involucre, and many times longer than the obtuse denticulate scales of the pappus.—Tampa Bay (*Dr. Feay*), and southward to Caximbas Bay. South Florida. October. Stem 3–5 feet long. Leaves 1–2 in. long.

[*To be continued.*]

NOTES ON HEPATICOLOGY, BY C. F. AUSTIN.—TRICHOCOLEA BIDDLECOMIÆ, *n. sp.*—Caule tenella arcte repens (semper?) subunciali simpliciter breviter pinnato, foliis fere transversalibus (subsuccubis) illis et amphigastriis fere ad basim capillaceo dissectis, fructu—?

On a rotten log in the cedar swamps, near Urbana, Ohio, 1876, *Miss H. J. Biddlecome.*

Much smaller than the smallest form of *T. Tomentella* (EHRH.) NEES, ever observed by me and readily distinguished from it by its simple and rather distantly pinnate stems. Its habitat, on rotten wood (to which it closely adheres), is also peculiar.

T. Tomentosa (SWARTZ) NEES, has a similar ramification, but is also a much larger plant, with the leaves strongly succubous (very oblique), and often not divided more than half way to the base.

TRICHOCOLEA GRACILLIMA, *n. sp.*—Caule gracillimo biunciali irregulariter dissitiuscule bipinnatim ramoso, rameis apice subrecurvis foliis subsuccubis fere ad basim dissectis, segmentis terretis (articulatis) pro genere crassis, fructu—?

On shaded ground, Island of West Maui, (altitude 4,000 feet), *D. D. Baldwin* (*Eaton.*)

Readily distinguished by its very slender habit, irregular bipinnate ramification and by the thicker capillary divisions of the leaves.

T. mollissima, TAYL.=*T. Tomentella! T. lanata*, (HOOK.) NEES=*T. tomentosa* (fide specimens from New Zealand, in Herb. SULLIV. ex-Herb. LEHM.) *T. Tomentella*, *Hepaticæ Cubensis Wrightiana*=*T. tomentosa!*

A FEW NOTES ON THE CHANGES OBSERVED IN VEGETATION.—I cannot say how extensive these changes have been, but the observations made extend over several square miles of surface. Of course one has to depend on the testimony of others for some of his facts in such a matter as this. In the town of Windsor, Conn., there are acres of land covered with White Birch, in place of a heavy growth of Pitch Pine that occupied the land when the place was first settled. Some fields are covered with White and Red Oak, with some Chestnut and Black Oak, in place of the Pine first found there. Others still are now covered with White Birch and scrub pines, that once were covered with a heavy growth of White and Black Oaks, with some Red Oak and Chestnut. The hazelnut bushes have made their appearance in many places—taken possession would perhaps be better, and White Pines are not unfrequent. The *new* growth referred to came in after the soil had been cultivated for quite a length of time. In fact it requires but a few years for a field to put on a good covering of timber, if left to itself. One field I have in my mind now, that has quite a heavy "second growth,"—pines, oaks, chestnut, &c.—that less than forty years ago was planted in corn. The owner told me he had raised good crops of corn and rye on that same field.

There must have been some source whence such changed vegetation was derived. Can any one tell from what source the seeds of an entirely dissimilar vegetation are derived? Soil brought up from almost any depth and kept from contact with the air, has been known to produce plants unlike any ever before seen in the locality. At least, what seems to be well authenticated instances of the kind are reported. In some parts of England where "Parks" have been cleared, an entirely new kind of timber springs up. Whence the seeds? One theory is that the seeds of former vegetation have preserved in the soil, their vitality being such that when shut away from the influence of the air they retain it a long time. The wheat found wrapped up with Egyptian mummies is given as an example. Another theory is the germs are floating in the atmosphere, and when they find a favorable spot they take root; but the seeds of the forest trees do not float very much. I will repeat my question, Can any one tell whence these seeds?—N. COLEMAN, *Berlin, Conn.*

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, November.—"Is the Existence of Growth-rings in the Early Exogenous Plants proof of Alternating Seasons?" This is an extract from a paper read before the N. Y. Academy of Sciences, by Chas. B. Warring, Ph. D. Various observations are mentioned and the facts established by them are formulated in the following propositions:

1. Some exogens form rings at intervals much less than a year.
2. Others require intervals of several years.
3. Some form no rings.
4. The presence or absence of rings in exogens occurs in all climates.
5. Large and well defined rings are found under conditions in which there is absolutely no appreciable variation of temperature or moisture throughout the year.
6. An exogen naturally forms rings, will continue to form them although the climate become uniform through the year.

The existence, therefore, of these markings in the ancient flora gives no information as to the existence at that time of seasons, and so far as they are concerned we are left free to adopt any conclusion as to the inclination of the earth's axis which may appear to us most reasonable.

Bulletin of the Torrey Botanical Club, September and October.—These are very interesting numbers, being full of valuable observations. Mr. Leggett is getting out another edition (it may be issued before this reaches the readers of the GAZETTE,) of the Botanical Directory. We regret that we are not able to give it wider notice owing to our beginning Vol. III. with the year, instead of publishing November and December numbers. We hope that all our readers will be prompt with information and with orders for copies. The price will be for a single copy, 40 cents; three copies for $1.00; a dozen for $3.00. Address WM. H. LEGGETT, 54 *Eighty-first street, New York.*

Field and Forest, October.—The Botanical Articles are "A Botanist's Winter Evenings," by W. W. Bailey, and "Notes on the Fungi of Maryland."

Proceedings of the Academy of Natural Sciences of Philadelphia, Part II., April, May, June, July and August, 1877.—The Botanical Notes are "On the *Eucalyptus globulus*," by Jos. Wharton, "Poisonous Properties of the Leguminosæ," by Dr. J. T. Rothrock, and "The Lacquer Tree," by Thos. Meehan.

Bulletin of the Minnesota Academy of Natural Sciences, 1877.—The most of this number is devoted to the "Mycological Flora of Minnesota," by Dr. A. E. Johnson. In it are listed 559 species all new to the State, two of which are new to science. Two divisions, six families, twenty orders, and seventy-seven genera are represented. Dr. W. H. Leonard gives a list of the Ferns of Minnesota, enumerating 30 species.

Catalogus Plantarum in Nova Cæsarea Repertarum.—If any State deserves a catalogue of its plants, surely New Jersey does, for its rich and varied flora has made it the Mecca of botanists. Dr. Oliver R. Willis has made this a very complete and handsome publication. He gives hints to beginners, and a list of plants recommended for their use, directions for drying and preserving plants, and a botanical directory. He enumerates 1,603 species of Phænogamous plants, 40 species of Equisetaceæ, Filices, and Lycopodiaceæ, and 28 species of Marine Algæ. There are 325 species of Musci, and 190 species of Hepaticæ found in the State, but not named in this catalogue, thus making an aggregate of 2,196 species of plants in the State.

American Naturalist, November.—A note on "Poisonous Grasses," gives the symptoms and antidotes for the poisoning resulting from eating *Stipa Sibirica*. *Melica* and *Lolium* are also spoken of as poisonous. An unusually large specimen of *Ostrya Virginica* is put on record. The girt of the stem at the ground was 9 feet 11 inches, at 4 feet from the ground 7 feet 2 inches; height to first branches 6 feet 4 inches; spread of branches from east to west 47 feet, from north to south 45 feet; height of tree 48 feet 7 inches. If any larger individual has been observed we would like to hear of it.

I much desire herbarium specimens of *Mertensia paniculata* and *M. maritima*. Will exchange for them *M. alpina* and *M. lanceolata* of the Rocky Mountain Alpine region.—H. N. PATTERSON, *Oquawka, Ill.*

Mr. Marcus E. Jones has sets of 500 species of Iowa plants, well preserved and very carefully pressed, which he will deliver to purchasers for $20.00 per set. Address him at Grinnell, Iowa.

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AN ENUMERATION OF SOME PLANTS—CHIEFLY FROM THE SEMI-TROPICAL REGIONS OF FLORIDA—WHICH ARE EITHER NEW, OR WHICH HAVE NOT HITHERTO BEEN RECORDED AS BELONGING TO THE FLORA OF THE SOUTHERN STATES. By A. W. CHAPMAN.

(Continued from p. 6.)

Lobelia Floridana, n. sp.—Perennial, smooth; stem stout, erect (3–5 feet high), rarely branching; leaves chiefly radical, clustered, spreading, lanceolate. sessile, crenulate, fleshy (6–9 inches long), the upper ones small and very remote; raceme rigid, rather closely many-flowered, the stout appressed pedicels as long as the linear denticulate bracts; calyx-tube enclosing about one-half of the ovoid capsule, strongly 10-ribbed, the lanceolate glandular lobes slightly auriculate at base; corolla (7–9 lines long) of varying shades of blue, villous within and on the lower lip; anthers sparingly hispid.—Margins of ponds and swamps in the pine forests of West Florida. June and July. Near *L. paludosa*, Nutt., with which it has been confounded.

Lobelia Xalapensis, H. B. K. Annual, glabrous; stem slender (1–1½ feet) weak, mostly branched; leaves petiolate, membranaceous, ovate, unequally and mucronately dentate, the upper ones narrower and subsessile; racemes very slender, loosely many-flowered, long peduncled, the pedicels 2-3 times as long as the filiform entire bracts; tube of the calyx broadly obconical, scarcely enlarged at maturity, and enclosing the base of the ovoid capsule, which is longer than the subulate lobes; corolla small, (5 lines), blue; anthers sparsely hispid.—Hammocks near Manatee, South Florida, (Dr. Garber.) Differs from *L. Cliffortiana*, Willd., only in its superior capsule.

Lobelia Feayana, Gray. Annual, glabrous, stems filiform, mostly simple, erect or ascending (4–8 inches high); leaves few, scattered, the lower ones orbicular, crenate (3–4 lines wide), abruptly contracted into a slender petiole: the others narrower, denticulate, subsessile; racemes remotely few (4–8) flowered, the naked, at length, spreading pedicels 2–3 times as long as the linear more or less denticulate bracts, and mostly longer than the small (2 lines long) deep blue corolla; calyx-tube top-shaped, enlarging at maturity, and enclosing about one-half of the ovoid capsule, the lobes subulate: anthers smooth.—Regions of the Upper St. Johns River, Durand (1866), Dr. Garber, and of Peace Creek, Florida, Dr. Feay. There are good reasons for the belief that this is the *L. Cliffortiana*, Mx. (*L. Michauxii*, Nutt.) and that it was erroneously said to have been found "in Virginia."

Campanula Floridana, Watson. Glabrous; stem filiform, angular, simple or sparingly branched at the summit; leaves lanceolate, entire, acute, subsessile, the uppermost ones linear; peduncles terminal erect; lobes of the calyx linear-subulate, bi-dentate, spreading, longer than the spreading 5-parted blue corolla; stigmas recurved.—South Florida, (Dr. Feay). Stem 6–12 inches high Leaves 8–10 lines long. Corolla 6 lines wide.

Chrysophyllum microphyllum, DC. Branchlets, lower surface of the leaves, pedicels, and calyx densely tomentose, cinnamon-colored; leaves thick, oblong-ovate, entire, acute at each end; pedicels axillary, shorter than the petioles, clustered, the lower ones single; lobes of the calyx oval, one-half as long as the smooth white corolla.—Banks of the Caloosa River, and Miami (Dr. Garber). South Florida. November. A small tree. Leaves 2–4 inches long.

Centunculus tenellus, Duby. Glabrous; stem filiform, simple, erect; leaves roundish, or oval, mucronate, entire, narrowed at the base, subsessile; pedicels single 2–3 times longer than the flowers, shorter than the leaf; calyx 4–5-parted, the subulate lobes as long as the white corolla.—Banks of the Caloosa River, South Florida. October. Stem 4–8 inches high. Leaves 3–4 lines long. Flowers minute.

Hydranthelium Egense, Poepp. ? Floating, sparsely pilose; stem filiform, rooting at the joints, the branches opposite or dichotomous; lower leaves small (2–3 lines long), oblong, very remote, the upper and floating ones larger, crowded, spreading, obovate or roundish, crenate, 5-nerved; peduncles shorter than the leaves; calyx-lobes ovate-lanceolate; lobes of the stigma ovate, spreading; capsule compressed, slightly obcordate; seeds linear pendulous.—New Orleans (Dr. Hale). The specimens are in fruit, and in the absence of flowers I am not certain that the plant is correctly referred.

Dasystoma patula, n. sp. Stem tall (3–4 feet long), slender, curving, pubescent, sparingly and divaricately branched; lower leaves oblong-ovate, pinnately lobed or toothed, serrate, contracted into a broadly winged petiole; the upper ones nearly sessile, lance-oblong, entire; pedicels slender (1–1½ inches long,) spreading or recurved, mostly longer than the lanceolate leafy bracts; calyx-lobes lanceolate, entire, spreading, rather longer than the yellow tube; corolla tubular-campanulate, yellow; filaments at the base and anthers woolly.—Valley of the Coosa River, near Rome, Georgia. September. Parasitic on roots.

Hygrophila lacustris, Nees. Stem erect, simple, obtusely 4-angled, (2–4 feet high); leaves sessile, lanceolate, acute; cymes opposite, sessile, few-flowered; calyx smooth, flowers white.—Muddy banks of the Apalachicola River (Dr. Saurman, 1866,), and of the Mississippi (Dr. Hale, Dr. Riddell).

Hyptis spicata, Poit. Closely pubescent; stem tall, branching, obtusely 4-angular, muricate; leaves ovate, coarsely serrate, acute, long-petioled; cymes opposite, short peduncled, 3–6 flowered, forming axillary and terminal interrupted racemes; calyx-teeth spine-like, spreading; corolla small, purple.—Tampa (Herb. Durand) and streets of Jacksonville, Florida. Stem 2–4 feet high.

Hyptis spicigera, Lam. Stem erect (1–2 feet high), branching, softly pubescent, often muricate, with a villous ring at the joints; leaves ovate, acute, serrate, paler beneath, twice as long as the slender petiole; the upper ones bract-like; whorls crowded into a dense lanceolate or oblong terminal spike; calyx villous at the throat; corolla very small, white.—Fort Meyers, and Miami (Dr. Garber), South Florida.

Satureia ? (*Pycnothymus*) *rigida*, Bart. Villous; stem low (4–6 inches high), assurgent, branching; leaves small (3–4 lines long), lanceolate, rigid, the revolute margins entire; flowers crowded in an oblong terminal head; calyx much shorter than the imbricated bracts, deeply 5-cleft, one-third as long as the tube of the blue spotted corolla.—Low pine barrens, South Florida.

Hedeoma graveolens, Chapm., (Gray Bot. Contributions). Stems numerous, shrubby at base, erect (1–1½ feet high), simple or sparingly branched, pubescent; leaves ovate or roundish, cordate, the lowest short-petioled and sparingly serrate; racemes spike like, many-flowered; flowers opposite, single, rarely sessile, the bracts and 2 opposite bractlets oblong, nearly equal; calyx slightly gibbous, the teeth ciliate; corolla purple, spotted at the throat; sterile stamens with abortive anthers; seed ovoid, smooth.—Low pine barrens, West Florida. July.

Salvia occidentalis, Swartz. Stem prostrate, diffusely branched, retrorsely pubescent, the internodes swollen (2–6 feet long); leaves ovate, acute, serrate, abruptly contracted into a short petiole, sparingly hispid; racemes spicate (4–6 inches long), the whorls approximate, mostly 6-flowered, as long as the ovate acuminate bracts; calyx glandular-villous, one-half as long as the small blue corolla; the teeth obtuse; lobes of the style flat, rounded.—Miami, South Florida, (Dr. Garber).

Var. *Garberi*. Racemes more slender, the whorls more scattered (2–6-flowered); corolla larger; teeth of the calyx ending in a long awn-like point. Manatee, South Florida, (Dr. Garber). Near *S. obscura*, Benth., but differs in its rounded stigmas.

Scutellaria montana, n. sp. Perennial? tomentose pubescent; stem simple, erect (1–1½ feet high); leaves of the stem and lowest pair of floral ones ovate, or oblong-ovate, coarsely and sharply serrate, acute at both ends, or the lowest subcordate, petioled, the floral ones small, lanceolate, entire; raceme simple, few-flowered; pedicels opposite, rather longer than the calyx; corolla large (1¼–1½ inches long) blue, the ample lower lip nearly as long as the curved upper one.—Dry woods and margins of fields in the mountains of Georgia.

Cordia speciosa, Willd. Rough with short appressed scattered hairs; leaves ovate or oval (2–3 inches long), petioled, mostly entire; flowers large (1 inch long), in a terminal compound corymb; calyx cylindrical-bell-shaped, 3–5-toothed, rusty-tomentose, one-half as long as the tube of the 5–8-lobed yellow corolla; stamens 5–8.—Miami (Dr. Garber.) and Jew-fish Key, South Florida. Shrub 5–8 feet high.

Heliotropium Leavenworthii, Torr. (ined?) Rough throughout with short white appressed rigid hairs; stems spreading, sparingly branched (1–2 feet long), very leafy; leaves nearly sessile, lanceolate (4–6 lines long); racemes many-flowered; bracts and calyx-lobes ovate-lanceolate; nutlets 4, hairy; flowers white.—Tampa, (Buckley in Herb. Durand), Sandy beach, Punta Roosa, South Florida. October.

Heliotropium tenellum, Torr. Annual? hoary with appressed white hairs; stem erect, slender, much branched (1 foot high); leaves linear; racemes naked or leafy, remotely few-flowered; calyx unequally 5-parted, the lobes broadly linear; nutlets roundish, pubescent above, reticulate below the middle. West Tennessee, and westward.

Convolvulus Garberi, n. sp. Stem long, shrubby, prostrate, canescent-tomentose; leaves small (6–10 lines long), oblong, obtuse, mucronate, narrowed into a short petiole; peduncles stout, single or by pairs, 1–3-flowered, longer than the leaves; calyx unequal, the 3 outer lobes obovate, twice as long as the 2 roundish inner ones; corolla (9 lines long,) white, sharply 5-lobed; capsule 6–9-valved; stigmas oblong.—Sandy coast at Cape Sable, South Florida (Dr. Garber).

Cuscuta obtusiflora, H. B. K. var. *glandulosa*, Engelm. Stems widely spreading, bright-orange; flowers short-pedicelled, single, or 3–5 in a cluster, glandular; lobes of the calyx and corolla obtuse or rounded; scales ovate, deeply fringed, incurved, slightly exserted; ovary and large capsule depressed; style short and thick.—Ponds near Apalachicola, Florida, mostly on *Polygonum*.

Solanum sisymbriifolium, Lam. Glandular-villous, armed with straight yellow prickles; stem tall (3–5 feet), branching; leaves ovate, petioled, pinnately divided near the base, deeply lobed above the middle; racemes loosely many-flowered; the lower flowers fertile; calyx hispid; corolla 5-cleft; berry globose, nearly included in the dilated calyx.—Waste places, Georgia and Florida.—Leaves 4–9 inches long. Corolla 1 inch wide, pale purple.

Withania Morrisoni, Dunal. Stem erect, branching, closely pubescent; leaves thin, obliquely cordate-oblong, or oval, acuminate, entire, or obscurely wavy, slender petioled; flowers small, 3–6 in a cluster; berry small; fruiting calyx globose; flowers yellow. (*Physalis Carpenteri*, Riddell.)—East Filiciana, Louisiana (Prof. Carpenter).

Echites biflora, Jacq. Smooth; stem very long, trailing or twining; leaves oblong-obovate and lanceolate, obtuse or acute, thick, narrowed into a short stout petiole; peduncles stout, 1–3-flowered, as long as the leaves; lobes of the calyx oblong, acute, one-half as long as the pedicel; tube of the large (2–3 inches long) funnel-shaped white corolla, 3–4 times as long as the calyx; follicle fusiform, 3–4 inches long; seeds linear, plumose.—Muddy Islets of the Caloosa River, South Florida. October.

Acerates Feayi, Chapm. (ined.) Leaves almost filiform, long, spreading; umbels terminal and sub-terminal, short-peduncled, few-flowered; corolla white, rather large, spreading; leaves of the crown oblong, entire, involute-concave, spreading, as long as the anthers, with a semi-oval, entire crest within (Gray).—Tampa, Florida, (Dr. Feay). This, in conformity with the arrangement of these plants in the "Southern Flora," would be an *Acerates*. Dr. Gray (Proc. Am. Acad. of Arts and Sciences V. xii. p. 72), by amending the characters of *Asclepias* so as to include these cristate species, appropriately refers it to that genus.

Gonolobus flavidulus (*G. hirsutus*, S. Flora). Stem downy and sparsely hairy; leaves ovate, cordate—the sinus open—acute, sparingly pubescent above, downy beneath (3-5 inches long); umbels mostly shorter than the petioles, simple or compound, the pedicels about the length of the flowers, which are ovate and obtuse in the bud; lobes of the corolla oblong, obtuse, finely reticulate, yellowish, smooth within, twice as long as the linear pubescent calyx-lobes; crown 5-crenate, incurved, with 2 erect minute subulate teeth in the sinuses; follicle muricate.—Light clay soil, Gadsden county, Florida. June. The *G. macrophyllus*, Ell., should, I think, be referred to this species.

Gonolobus Baldwinianus, Sweet. Stem and leaves of the preceding; peduncles mostly longer than the petioles; umbels simple or compound, the pedicels mostly longer than the flowers which are oblong-ovate in the bud; lobes of the corolla somewhat spatulate, white, three times as long as the calyx; crown 5-crenate and with a pair of longer subulate lobes in the sinuses.—Calcareous soil, Chattahoochee, Florida, and westward. May and June.

Euphorbia tetrapora, Engelm. Smooth; stem erect, umbellately branched; leaves cuneate, obtuse or emarginate, the uppermost ones roundish, truncate at the base; glands of the involucre 2-horned; capsule smooth; inner face of the seed 4 pitted, the outer face smoothish.—Georgia (Boykin ex Engelmann).

Euphorbia ammannioides, H. B. K. Smooth throughout; stems filiform, very numerous, long (2-3 feet), prostrate, alternately much branched; leaves opposite, oblong, (3-5 lines long), entire, rounded and mucronate at the apex, short petioled; stipules 2-parted; flowers single, terminal, and in the forks of the branches; glands margined with white; capsule obtusely triangular; seeds ovate, obscurely triangular, pale, smooth and even.—Roberts' Key, in Caximbas Bay, South Florida.

Papaya vulgaris, DC. Stem simple (6-15 feet high), leaves roundish, cordate, long-petioled, mostly seven-parted, the divisions broadly sinuate; flowers yellow; the sterile ones salver-shaped, in panicled clusters; the fertile ones larger, bell-shaped, single, or 2-3 together, the long lobes linear-lanceolate; style short; stigmas 5, spreading, fruit pulpy.—South Florida.

Thrinax parviflora, Swartz. Stem smoothish, tall (10-30 feet); leaves fan-shaped, soon smooth; the numerous linear-lanceolate divisions tapering to the slender deeply cleft apex, and united about one-third their length, ligule triangular, acute; spadix smooth paniculate, scarcely shorter than the leaves; flowers very small; drupe white, globose, of the size of a grain of Allspice.—Keys along the Florida Reefs, extending up the west coast as far as Cape Romano.

Thrinax Garberi, n. sp. Stem very short; leaves fan-shaped, on slender roughish petioles, smooth, parted nearly to the base into several strap-shaped slightly cleft divisions; ligule short, rounded; spadix very small (6-8 inches high), spathes (about 4) tubular, dilated upward, oblique, somewhat woolly; flowers very small, divisions of the perianth minute, subulate; stamens 8-10, drupe (immature) pear-shaped. (*Sabal minima*, Nutt. ?).—Rocky pine woods near Miami, South Florida, (Dr. Garber.)

Several Epiphytic Orchids and Tillandsias have been detected in South Florida by Dr. Garber and myself, which are omitted in this enumeration.

[*To be Concluded.*]

Poa Lemmoni, *n. sp.*—Among some grasses received from Mr. J. G. Lemmon, Sierra county, California, two years ago, was one which I have since distributed as *Poa Lemmoni*. Its characters may be given as follows:

Poa Lemmoni.—Whole plant light green and somewhat glaucous, culms wiry, erect, 1 to 1½ feet high; radical leaves setaceous, involute, pungently pointed, slightly scabrous on the margin, 2 to 6 inches long; culm smooth, with about 3 leaves whose sheaths are longer than the internodes, the upper one sheathing the base of the panicle, the blades 2 to 3 inches long and setaceous; panicle contracted, one-third the length of the culm, or more, rays about in fives, unequal, from 1 to 4 inches long, and the longer ones twice as long as the internodes of the panicle, appressed, slightly scabrous; spikelets linear, on rather slender pedicels, 5 to 6 lines long, 7 to 9-flowered, the glumes small, the upper one two-thirds, the lower one about half the length of the lower palet, lanceolate and acutish; the lower palet narrow, linear, about 1 line in length, convex on the back and slightly compressed near the apex; very finely pubescent or minutely scabrous, obtuse or sometimes slightly acute, scarious at the tip, purplish on the margins.

This grass belongs to the genus *Schlerochloa*, P. de B., which Dr. Gray places under *Glyceria*, but which Mr. Bentham includes in *Poa*. It differs from *Poa* chiefly in the linear spikelets and small unequal glumes.

The genus or section *Heleochloa*, Fries., is essentially the same. The section *Atropis*, Trin., as given in *Mem. Imp. Acad. Sciences, St. Petersburg*, 1836, "spikelets linear, lower glume less than half as long as the florets," would seem also to come under the same sub-division. But the California grass distributed by Bolander and others as *Atropis Californica*, Munro, has nearly equal glumes about as long as the florets, and the spikelets are much larger and broader.—Geo. Vasey, *Washington, December*, 8, 1877.

Addenda.—During the past season several new plants have been added to the Flora of Jefferson Co. The re-discovery of *Spermacoce glabra* has already been recorded in these pages. Among the additions are three very desirable species and we notice them briefly. *Martynia proboscidea*, Glox., was found this year well established on the river bank at Madison. The seeds were probably drifted down and deposited at the overflow in August, 1876. If the plant reappears next season we hope to make some observations on its insectivorous (?) habits.

Iris cristata, Ait., has established itself on the rocky banks of a creek near Hanover. No plants were found in bloom but the species is undoubted.

Ophioglossum vulgatum, L.—Four specimens in good fruit were secured this spring and numbers of sterile fronds were seen near the same locality.—B.

Nelumbium Luteum in Michigan.—In volume one, number four, Mr. Frank H. Tuthill, of Kalamazoo, says, "this plant is found 14 miles south of this place (Kalamazoo), and this, I believe, is its only station in our State where it flowers. It grows in a mill-pond, and hence must have been introduced after the country was settled." Two or three years ago, I received flowers and leaves which were said to have been taken from a natural pond called Indian Lake, situated some twelve miles south-east of Kalamazoo, or about eight miles south of Galesburgh. I have lately received a card from Mr. H. Dale Adams of the latter place, who speaks of the locality called Indian Lake. He also speaks of the mill-pond. Mrs. Adams once lived near this mill-pond, made in 1829. She thinks there was then a natural pond (now a part of the mill-pond), in which grew the *Nelumbium*. This plant is now found on one or more islands in the Detroit river, where an effort was made a few years ago to introduce it, though in some parts of the river it may be indigenous. It is quite abundant at Monroe, where it was known to the Indians a long time ago. It is plenty in the Maumee river in Toledo, Ohio.—W. J. Beal, *Agricul. College, Lansing, Mich.*

Mr. L. M. Underwood sends some fine specimens of *Scolopendrum vulgare*, collected at Green Pond, Onondaga Co., N. Y.

In a letter from Mr. Thos. Meehan he mentions that *Acanthospermum xanthoides* is making itself at home in many parts of the Southern States.

Mr. N. Coleman writes as follows: "I have found *Eupatorium perfoliatum* with pink florets this fall, and one plant of *Plantago lanceolata* without stamens. But the most singular find of the season has been *Plantago lanceolata* with branching spikes. I came across several that had two or three or more spikes at base of the main spike. From the form of the latter I could not see any possible insect agency in the case."

Yucca Draconis.—One of the most interesting exhibits at our late Agricultural Fair were three growing plants of the shrubby, palm-like *Yucca Draconis*, L., and samples of a very superior quality of paper, both brown and white, which is being manufactured from the fibres of this plant in two localities of this State, viz: at Soledad Mills, Los Angelos county, and at the Lick Mills, Santa Clara county. Sections of the caudex, which often attains a height of 20 feet, with its pulp in every stage of the process of paper-making, bleached and unbleached for white and colored paper, for the purposes of printing, wrapping, etc., were displayed.

The Yucca forms an abundant native growth of the desert portions of Southern California, Arizona and Northern Mexico. The Southern Pacific railroad which passes through many miles of these forests, affords ample facilities for its transportation and utilization.—M. E. P. A., *San Jose, Oct. 15th*, 1877.

Recent Publications.—*American Journal of Science and Arts*, December.—The herbarium of the late Arthur Schott is offered for sale. It is said to contain 7,000 species and to be rich in plants of the United States and Mexican Boundary, of Mexico and of Central America. Application to be made to H. Schott, Georgetown, D. C. An extract is given from Nature of Oct. 25, being an article by Sir Joseph Hooker upon his recent trip to the Rocky Mountains in company with Dr. Gray. We have space to give, in the words of Dr. Hooker, only the result of the expedition: "The net result of our joint investigation and of Dr. Gray's previous intimate knowledge of the elements of the American flora is, that the vegetation of the middle latitudes of the continent resolves itself into three principal meridional floras, incomparably more diverse than those presented by any similar meridians in the old world, being, in fact, as far as the trees, shrubs, and many genera of herbaceous plants are concerned, absolutely distinct. These are the two humid and the dry intermediate regions. Each of these again is sub-divisible into three, as follows:

(A.) The Atlantic slope plus Mississippi region, sub-divisible in (1) an Atlantic; (2) a Mississippi valley; and (3) an interposed mountain region with a temperate and sub-alpine flora.

(B.) The Pacific slope, sub-divisible into (1) a very humid cool forest-clad coast range; (2) the great hot drier Californian Valley, formed by the San Joaquin River flowing to the north, and the Sacramento River flowing to the south, both into the Bay of San Francisco; and (3) the Sierra Nevada flora, temperate, sub-alpine, and alpine.

(C.) The Rocky Mountain region (in its widest sense, extending from the Mississippi beyond its forest region to the Sierra Nevada), sub-divisible into (1) a prairie flora; (2) a desert or saline flora; (3) a Rocky Mountain proper flora, temperate, sub-alpine, and alpine."

The Oaks of the United States. (Continuation.) By Dr. Geo. Engelmann. In this paper Dr. Engelmann first makes some corrections and additions to his former paper on this genus, published over a year ago.

The following is believed to be a more correct enumeration and more natural arrangement of our oaks:

I. LEPIDOBALANUS, Endl.

A. LEUCOBALANUS.

*Maturatio annua.

†Folia decidua.

Q. alba, lobata (fruticosa), Garryana, stellata, macrocarpa, lyrata, bicolor (Michauxii), Prinus, Muhlenbergii (prinoides), Douglasii, undulata (pungens.).

††Folia persistentia.

Q. oblongifolia, dumosa, reticulata, virens.

**Maturatio biennis.

Q. chrysolepis (vaccinifolia, Palmeri), tomentella.

B. MELANOBALANUS.

*Maturatio annua, folia persistentia.

Q. Emoryi, agrifolia, pumila, hypoleuca.

**Maturatio biennis.

†Folia decidua.

Q. rubra, coccinea (tinctoria,) Sonomensis, falcata, Catesbæi, ilicifolia, palustris, Georgiana, aquatica, laurifolia, nigra, cinerea, imbricaria, Phellos.

††Folia persistentia.

Q. Wislizeni, myrtifolia.

II. ANDROGYNE, A. DC.

Q. densiflora.

The names in parentheses designate sub-species.

The American Junipers of the section Sabina, by Dr. Geo. Engelmann.—The author treats the subject in the following order: the bark, the wood, the leaves, the flowers, the seeds, and the geographical distribution. The nine American species are then arranged in the following order:

I. SABINÆ, with larger, reddish-glaucous, fibrous, dry, sweetish berries.

A. Seeds single or few; leaves fringed or denticulate.

a. Cotyledons 4–6.

(1.) *J. Californica.*

b. Cotyledons 2.

(2.) *J. Mexicana.*

B. Seeds numerous, 4-12; leaves slightly denticulate.

(3.) *J. pachyphlæa*, and (4.) *J. flaccida*.

II. SABINÆ, with smaller, bluish-black (rarely brown) pulpy berries, of resinous taste.

A. Leaves ciliate or denticulate.

(5.) *J. occidentalis*, (6.) *J. conjungens*, and (7.) *J. tetragona.*

B. Leaves entire or nearly so.

(7.) *J. Sabina*, (8.) *J. Virginiana*, and (9.) *J. Bermudiana.*

The Flowering of Agave Shawii, by Dr. Geo. Engelmann.

Ferns of North America, by Prof. Daniel C. Eaton.—Although late it is not too late to notice Part I. of this magnificent work. The plates and press work are as fine as can be made even in these days of superb printing. Four species are illustrated and fully described. They are *Lygodium palmatum*, Swartz., *Cheilanthes vestita*, Swartz, *C. Cooperæ*, D. C. Eaton, and *Asplenium serratum*, Linn. There is also a synopsis of the species of *Cheilanthes* known to occur in the United States. All botanists who are at all able will be amply repaid by subscribing for this work. The Parts are very cheap at $1.00 each. Address the Naturalists' Agency, Salem, Mass.

Notes on Botrychium simplex, Hitch., by Geo. E. Davenport.—This valuable paper is the result of two years careful preparation. It is printed on heavy plate paper, is 10x12 inches in size and contains two plates by J. H. Emerton. These plates give nearly fifty figures of specimens of *B. simplex* and other species which have been confused with it. Only a very small private edition has been issued, and those desiring to obtain a copy of this work can do so by remitting one dollar to John Robinson, Salem, Mass.

Correspondance Botanique; Liste des Jardins, des Chaires et des Musees Botaniques du Monds, 5th edition, September, 1877.—This is quite a bulky pamphlet and contains the names and addresses of over 1,200 botanists from all quarters of the globe. It is published by Prof. Ed. Morren of Liege, Belgium. The sixth edition will be issued as soon as possible in 1878

J. Herman Wibbe, Ph. D., is willing to exchange the rare *Erythræa Centaurium*, or the Spruce Parasite, *Arceuthobium pusillum*, Peck, for any other species peculiar to the West or South. Address him at Oswego, N. Y.

H. Eggert has issued a new prospectus for 1878, in which he has many good plants. He sells them at the rate of $8.50 for 150 species. Address him at 918 Wash St., St. Louis, Mo.

All communications should be addressed to

John M. Coulter, Hanover, Ind.,

or, M. S. Coulter, Logansport, Ind.

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AN ENUMERATION OF SOME PLANTS—CHIEFLY FROM THE SEMI-TROPICAL REGIONS OF FLORIDA—WHICH ARE EITHER NEW, OR WHICH HAVE NOT HITHERTO BEEN RECORDED AS BELONGING TO THE FLORA OF THE SOUTHERN STATES. By A. W. CHAPMAN. (*Concluded from page* 12.)

Pancratium (*Hymenocallis*) *Caribaeum*, L. Bulb large, without runners? leaves broadly lanceolate, erect-spreading (1½–2 feet long, 2–3 inches wide), obtuse; scape stout, 2-edged (2–3 feet high), many-flowered; tube of the perianth rather slender (5 inches long), about as long as the linear recurved white divisions; crown funnel-shaped, entire, or with few small teeth between the filaments.—Sandy Coast of South Florida, from Tampa Bay and Southward. Flowers very fragrant.

Pancratium (*H.*) *crassiflorum*, Herb. Bulb large, with runners; leaves erect, lorate, obtuse, concavo-convex, thick and rigid (1½–2 feet long, ¾ inch wide); scape stout, glaucous, rather longer than the leaves, 2-flowered; tube of the perianth thick (3–4 inches long), shorter than the linear spreading ochroleucous divisions; crown white, large, funnel-shaped, ⅓ as long as the perianth, variously toothed between the filaments.—Low pine barrens, West Florida.

Agave rigida, Miller, var. *Sisalana*, Engelm. Caulescent; leaves long (4–6 feet), linear-lanceolate, the margins more or less spiny, the terminal spine not decurrent; scape tall (15–20 feet), leafy-bracted; panicle large, widely spreading, the clustered flowers often viviparous; corolla funnel-shaped; stamens and style exserted.—Coast of Florida, Tampa Bay and Southward.

Juncus brachycarpus, Engelm. Stem erect (1–2 feet high), mostly 2-leaved; leaves nodose; heads 2-10, spherical, densely many-flowered, pale green; sepals linear-subulate, unequal, the 3 outer ones much longer than the inner ones, and the ovoid acute 1-celled capsule; style very short.—Near Charleston, South Carolina. (*Beyrich fide Engelmann.*)

Cyperus ligularis, L. ? (not of S. Flora). Umbel many-rayed, erect; head compact, cylindrical, pedunculate, the lateral ones shorter, ovate, nearly sessile, spreading; spikelets very numerous, crowded, short (2–3 lines long), lanceolate, sub-compressed, spreading or reflexed, pale, about 7-flowered; scales membranous, ovate, acute, 7-nerved, twice as long as the obovate triangular pointed nut; rachis broadly winged; culms stout, nearly terete (2–3 feet high), glaucous, like the broadly linear rough-margined leaves, and involucre.—Punta Rassa, South Florida. November.

Cyperus purpurascens, Vahl ?=*C. ligularis*, S. Flora.

Cyperus dissitiflorus, Torr. Cyp. Umbel simple, of 3–4 erect slender rays, shorter than the 3-leaved involucre; spikelets loosely inserted along the upper portion of the rays, lanceolate, acute, compressed, 5-7-flowered; scales oblong-lanceolate, acute; nut obovate-oblong, obtusely angled in front; rachis narrowly winged; culms filiform, from a thickened base (1–2 feet high); leaves very narrow.—Mississippi (*Carpenter*), New Orleans (*Hooker, fide Torrey*).

Cyperus retrorsus, n. sp. Umbel simple, 8-rayed; heads clavate-cylindrical; spikelets lanceolate, acute, reflexed; scales 4, the third one fertile, oblong, 9-nerved, rather longer than the oblong triangular nut, the fourth lanceolate, neutral; rachis very slender, broadly winged; culms slender (2 feet high), very smooth, triangular; leaves linear; involucre longer than the umbel.—Robert's Key, Caximbas Bay, South Florida.—Near

C. retroflexus, but more slender, with shorter and thicker spikelets, and narrower heads.

Cyperus cylindricus, n. sp. Umbel 3-6-rayed, erect, simple; heads simple, cylindrical, (1–1½ inches long,); spikelets very numerous, spreading, lanceolate, 7-9-flowered; scales oblong, obtuse, 7-9-nerved, the 2 lower ones empty, the 2-3 upper ones abortive; nut acutely triangular, oblong; rachis slender, narrowly winged; culms (1–3 feet high,) triangular, smooth, as long as the broadly linear smoothish leaves; leaves of the involucre 3–6, longer than the umbel.—Collier's Key at Marco Pass, South Florida.—Near *C. cephalanthus*, Torr. and Hook.

Scirpus ? Cubensis, Poepp and Kunth. Culm acutely triangular, leafy at the base (8–10 inches high); leaves longer than the culm, linear; involucre very long, 5-leaved; spikes obovate, compressed, 12-flowered, closely packed in a compound globular sessile terminal head; scales rigid, loose, obovate-oblong, tapering to a stout spreading point, 13-nerved; stamens 3; style long, deeply 2-parted; nut ovate-lanceolate, concavo-convex, acuminate; bristles none.—New Orleans, (*Dr. Hale*).

Trichelostylis miliacea, Nees. Culm weak, compressed-4-angled (6–12 inches high); leaves straight, erect, ensiform; umbel decompound, widely spreading, many times longer than the 2 subulate leaves of the involucre; spikes small, (1 line in diameter), globular; scales oblong, obtuse, 3-nerved; nut pale, obovate, slightly roughened. (*Scirpus*, L., *Fimbristylis*, Vahl.)—Ditches, &c., Apalachicola, Florida.

Isolepis carinata, Hook and Arn. Culm setaceous (3–6 inches high), slightly compressed, furrowed, with a single setaceous leaf at the base; spike solitary, sub-lateral, ovate, 6–8-flowered; scales ovate, acute, strongly keeled, twice as long as the short acutely triangular roughish nut.—New Orleans, (*Dr. Hale*).

Leersia monandra, Swartz. Panicle nearly simple, spreading, exserted; spikelets minute, ovate, acute, compressed, glabrous; stamen solitary; culm slender (2–3 feet long), smooth; leaves broadly linear, rough above and on the margin.—South Florida, (*Herb. Thurber.*).

Pharus latifolius, L. ? Leaves oblong, acute, rough beneath, longer than the petiole-like sheath; lower palea of the pistillate spikelet acute, downy on the back, twice as long as the lanceolate glumes.—Orange Lake, Florida, (*Herb. Thurber.*).

Sporobolus purpurascens, Hamilton. Culms tall (2–3 feet) branching; leaves long, narrow-linear, slightly scabrous above, mostly hairy at the base; ligula a villous ring; panicle racemose, simple, the short spreading branches whorled; flowers short-pedicelled, smooth; glumes unequal, the upper one as long as the palæ, twice as long as the lower one.—Wet sandy places, subject to tidal overflow. Jew-fish Key, South Florida

Muhlenbergia cæspitosa, n. sp. Culms tufted, simple (2 feet high); leaves short (4–6 inches long), narrow-linear, flat; panicle terminal, long-peduncled, sparingly branched, the straight setaceous rough branches erect; palæ 3-nerved, bearded at the base, 4 times as long as the oval obtuse or denticulate glumes, and equalling the stout rough awn.—Dry pine barrens, near Apalachicola, Florida. July 4.—Resembles *M. trichopodes*.

Sclerachne Arkansana, Torr. Annual, low, tufted; culms erect (6–12 inches high), branching; leaves narrow, flat, pubescent, panicle contracted (2–6 inches long); glumes rigid, hispid; lower palæ rigid, rough-awned; stamens 2.—Shell-banks, near Apalachicola, Florida. April.

Aristida simpliciflora, n. sp. Culms filiform, erect (2 feet high), sparingly branched; leaves narrow-linear; racemes simple, very slender, straight (6–9 inches long); flowers scattered, on short pedicels, single, or the lower ones by pairs; glumes nearly equal, awn-pointed (3½ lines long), the outer one longer than the palæ; awns widely spreading, the lateral ones as long as the glumes, straight, the middle one curving in a semicircle at base.—Damp pine barrens, West Florida.

Aristida gyrans, n. sp. Cæspitose, glabrous; culms simple, filiform (1 foot high),

purple; leaves convolute-filiform, shorter than the culm; panicle simple, few-flowered, the branches short, appressed; glumes very unequal, the lower as long as the palea, truncate, short-awned, roughish; the upper ⅓ longer, attenuate, smooth; paleæ long-stipitate; awns nearly equal, straight, gyrate at base, ⅓ longer than the paleæ.—Robert's Key in Caximbas Bay, South Florida.—In wet weather the awns are staight, but immediately assume their curved form when dry, as do some other awned grasses.

Aristida scabra, Kunth. Culm very short (1–2 inches) from a creeping base; leaves numerous, long, linear, their smooth sheaths enwrapping the base of the long-peduncled panicle, this very large (1½–3 feet long), the widely spreading branches in alternate clusters of 2–5, flowers scattered, appressed; glumes awn-pointed, the lower one longer, the keel rough; awns erect, straight, the middle one many times longer than the minute lateral ones, 3–4 times longer than the glumes; stamens 2.—Dry sandy coast, West Florida. September.

Aristida condensata, n. sp. Culms rather stout, simple, erect; leaves rigid, linear, flat or concave, soon convolute, rough on the margins; panicle long-peduncled, contracted, densely many-flowered (1–1½ feet long); glumes equal, awn-pointed, rough on the keel, longer than the paleæ; awns erect, straight, nearly equal, longer than the glumes.—Dry sandy soil, West Florida.

Triplasis sparsiflora, n. sp. Annual ? culms numerous (6–12 inches high), rigid, branching; leaves short (1–3 inches), linear-subulate, the upper ones shorter than their sheaths, which are mostly longer than the internodes; racemes simple, axillary and terminal, appressed, few-flowered; spikelets 2–4-flowered (the uppermost awn-like), the flowers large, distant; glumes thin, nearly equal, the lower cleft, the upper acute, ½–⅔ as long as the spikelets; lower palea scarious, oblong, 3-nerved, ciliate on the margin, strongly bidentate, twice as long as the scabrous awn; upper palea shorter, villous on the nerves above the middle.—Sandy coast at Punta Rassa, South Florida. October.

Paspalum tristachyum, Leconte. Culms creeping; flowering branches erect, short, 1-jointed; leaves oblong-linear, obtuse, flat, ciliate (1–2 inches long); peduncles 2–4 from the long sheath of the uppermost leaf (6–12 inches long); spikes 2–4, filiform, erect or spreading; spikelets in 2 rows, oblong-ovate, acute, as wide as the slender flexuous rachis; glumes sparingly hairy, 3-nerved. (*P. barbatum*, Schultes ?)—Damp places, Apalachicola, Florida. Perennial.—Near *P. Michauxianum*, Kunth.

Paspalum conjugatum, Berg. Culm smooth, branching, slender (1½–2 feet high); leaves linear, thin; spikes 2–3, long and slender, compressed, the terminal pair conjugate; spikelets very small, in 2 rows, ovate, yellowish; the margins loosely fringed with long weak hairs, nerveless.—New Orleans, (*Dr. Hale*).

Panicum paspaloides, Pers. Culm erect; leaves linear, smooth; panicle spicate, compound; the numerous crowded branches appressed; spikelets secund, in 2-rows, ovate, acute; glumes roundish, 5-nerved, much shorter than the acute paleæ, sterile flower of 2 paleæ, triandrous.—South Florida (*Blodgett in Herb. Thurber*).

Panicum maximum, Jacq. Culms tall (6–8 feet high); leaves flat, rigid; panicle large, (1½ feet long), erect, compound; branches whorled; spikelets oblong, smooth; glumes thin, faintly 5-nerved, obtuse, the upper one as long as the paleæ, and twice as long as the ovate, acute, lower one; sterile flowers triandrous.—South Florida, (*Blodgett in Herb. Thurber*).

Panicum striatum, Lam. Culm stout (2–3 feet high), sparingly branched; leaves lanceolate, smooth, the margins rough; panicle sub-corymbose, consisting of several erect, simple racemes, 4–5 inches long; spikelets rather large, scattered, lower glume ovate, clasping, the upper and lower sterile paleæ strongly 7-nerved.—Banks of the Caloosa River, South Florida. October.

Panicum prostratum, Lam. Culms creeping; leaves short (1–2 inches long), ovate-lanceolate; panicle short (2 inches long), consisting of 5–10 simple branches; spikelets

secund, oblong-ovate, acutish; upper glume 5-nerved; sterile flower triandrous; rachis sparsely hairy.—New Orleans, (*Dr. Hale*).

Panicum amplectens, n. sp. Very glabrous; culm slender, erect, the nodes black; leaves long, linear, with setaceous tips; panicle peduncled (6-10 inches long), erect, the scattered branches single, racemose-compound; spikelets oblong-ovate, acute; glumes strongly 5-7-nerved, the lower one orbicular or reniform, clasping, ¼ as long as the upper one; sterile flower neutral.—South Florida.—Allied to *P. maximum* and *P. virgatum*.

Cenchrus strictus, n. sp. Glabrous; culm strict, erect, simple, or at length sparingly branched (2-3 feet high); leaves numerous, linear, conduplicate, the lower sheaths dilated and longer than the internodes; spike cylindrical, many-flowered; involucre cuneate and naked at the base, the 10 or 11 stout spines ciliate, longer than the 2 acute smooth spikelets; sterile flower triandrous.—West coast of Florida, Apalachicola and Southward.

Andropogon arctatus, n sp. Culms tall (2-5 feet high), single, compressed, the erect branches forming a long simple panicle; leaves distant, linear, shaggy with long, mostly deciduous, hairs, as are also the sheaths; spikes by pairs, exserted, narrow (1-1½ inches long), rather rigid, closely 15-20-flowered; glumes rough, twice as long as the stout joints, and ½ the length of the short bent awn; pedicel of the neutral flower tipped with 2 slender glumes; hairs of the involucre few and short; stamen 1. (*A. tetrastachyus*, var. *distachyus*, S. Flora).—Low pine barrens, West Florida.

Sorghum pauciflorum, n. sp. Annual; culms branching near the base (2-3 feet high); leaves broadly linear, flat, ciliate; flowers few (6-12), in a simple raceme, the very long (2-3 inches) setaceous pedicels in whorls of 2-6, rough, spreading; glumes equal, linear, rigid, convolute, scabrous at the apex, the lower one 2-toothed, the upper one truncate; awn very long (5-6 inches), geniculate, twisted and tortuous below the middle; sterile flowers either triandrous, linear, acute, perfect, but the short style abortive, or reduced to 2 setaceous spirally twisted pedicels.—Sandy pine barrens, near Jacksonville, East Florida.—This is unlike our other species, and has the aspect of a *Stipa*.

Imperata, Cyr. ? sp. Culm erect from a creeping base (2-3 feet high), simple; lowest leaves crowded, lanceolate, flat, the throat and sheaths more or less hairy, the upper ones small and remote; panicle long peduncled, loosely racemose (3-4 inches long), white from the copious wool of the flowers, the lower branches distinct, the upper ones crowded; spikelets small, all alternate and short-pedicelled, deciduous; glumes linear, villous with long silky spreading hairs, grain free.—Banks of the Caloosa River, South Florida.—The specimens are in fruit, and all the flowers detached; and it is uncertain whether they belong to *Imperata* or *Saccharum*, or to either of them.

Aspidium unitum, var. *glabrum*, Mettenius. Fern 2-4 feet high, from a long slender black rootstock, nearly glabrous; frond ovate-lanceolate, (1½-2 feet long), pinnate, pinnæ rather rigid, lanceolate, serrately lobed, the lower ones often sterile; fruit-dots contiguous, forming a continuous zigzag intramarginal line.—South Florida, in boggy places.

Ophioglossum palmatum, Plumier. Fern epiphytic, thick, succulent, drooping, 4-10 inches long, from a tuberous woolly rootstock; frond stipitate, cuneate at base, simple, or palmately 2-6-lobed, the lobes tongue-shaped, rarely forking, reticulate-veined; spikes 1—several at the summit of the stipe, or along the basal margins of the frond (1 inch long), peduncled.—In the axils of the leaves of the Palmetto, banks of the Caloosa River, South Florida.

Lycopodium inundatum, L., var. *appressum*. Size and habit of var. *pinnatum*, but leaves thinner, all entire, those of the spike, which is scarcely thicker than its peduncle, closely appressed.—Banks of the Caloosa River (November,) and Duval County, (*Curtiss*).

Lycopodium inundatum, L., var. *elongatum*. Stem creeping, sparingly branched (1½-2 feet long); leaves subulate, attenuate, entire, spreading; peduncles slender, erect or leaning (10-15 inches long), the scattered leaves narrowly subulate; those of the spike longer, spreading.—Wet banks, Apalachicola, Florida.

Lycopodium cernuum, L. Stem slender, forking near the base, the divisions arcuate-recurved, rooting at the tips, the short alternate branches forking, and terminated by the short (4-6 lines long) nodding spikes: leaves lax, about 6-ranked, linear-subulate, entire, spreading or recurved, those of the spike ovate, acuminate, the margins bristly. —Wet sandy places near Waldo, and Duval county, East Florida (*Curtiss*).

Marsilea uncinata, A. Braun. Stem long, filiform: leaflets fan-shaped, smooth, or with few scattered hairs, entire, 6-8 lines long, the slender petiole 3-6 inches long; sporecase oval, compressed, horizontal, pubescent, 2-toothed, of which the upper one is uncinate-incurved, half as long as its erect stipe.—Banks of the Mississippi below Vicksburg.

Salix Barclayi Anders, a native of the Northern States. Among the Willows of the Philadelphia Acad. Herbarium we find a folded sheet containing a miscellaneous lot of undetermined leaves and aments from Kodiak and Sitcha, collected by the late Dr. Kellogg, of the United States Coast Survey. Some of these are clearly *Salix Barclayi*, And., of which no specimens were known to be extant in American herbaria, the types of the species being preserved in "the great storehouse of the world's botany at Kew." Our interest in this species is brought nearer home since it now appears that the peculiar willow found on the lake shore near Chicago by Prof. Babcock, and which to avoid the multiplication of supposed new species was briefly mentioned in his Catalogue of the Plants of Chicago as *S. cordata*, var. *glaucophylla*, should be referred to *S. Barclayi;* or else this species, Alaskan forms and all, be reduced to a variety of *S. cordata*, of which it appears to be a robust Western modification. The leaves are broader and shorter than in *S. cordata*, with somewhat the consistency of *S. lucida*, and when young turn black in drying; the capsules are much larger: the style longer, and the pedicels (mostly concealed by the densely villous scales) though showing the ordinary variation in length are shorter than in *S. cordata*, but not so short (even in specimens from Kodiak) as described and figured by Andersson. The aments resemble those of *S. discolor*, in size and woolliness. The common form with us accords with Prof. Andersson's var. *grandifolia*. Leaves 2 inches long by an inch broad, dark green and somewhat shining above, conspicuously glaucous beneath, minutely and sharply serrulate, &c. In specimens from Alaska the leaves are rarely floccose villous especially when young or the mid-rib at least tomentose above, but they are very variable in this respect, often quite glabrous, and some of them precisely similar to forms collected by Prof. Babcock.

It is remarkable that this Willow should not have been found at intermediate stations in the Northwest by either Richardson, Drummond, Bourgean or Dr. Lyall, nor have we ever received it from elsewhere than the west shore of Lake Michigan, though favored by many friends in the Northern States with the Willows of their respective localities.—M. S. Bebb.

Lichens of Southern Illinois.—Mr. J. Wolf, of Canton, collected the following Lichens in Southern Illinois in the summer of 1877:

1. *Ramalina calicaris* Fr.
2. *Usnea barbata* (L.) Fr.
3. *Parmelia saxatilis* (L.) Fr.
4. *caperata* (L.) Ach.
5. *Physcia aquila*, var. *detonsa* Tuck.
6. *pulverulenta* (Schreb.) Nyl.
7. *speciosa* (Wulf., Fr.)
8. *Nephroma laevigatum* Ach.
9. *Pannaria microphylla* (Sw.) Del.
10. *leucosticta* Tuck.

11. *crossophylla* Tuck.
12. *molybdæa*, var. *eronia* Tuck. cum fructu.
13. *Pannaria nigra* (Huds.) Nyl.
14. *Synalissa Schæreri* (Mass).
15. *Collema microphyllum* Ach.
16. *flaccidum* Ach.
17. *pulposum* (Bernh.) Ach
18. *pustulatum* Ach.
19. *Leptogium subtile* Nyl.
20. *pulchellum* (Ach.) Nyl.
21. *myochroum*, var., *saturninum* (Dicks.) Tuck.
22. *Placodium cerinum* (Hedw.) Næg.
23. *Placodium aurantiacum* (Lightf.) Næg.
24. *ferrugineum* (Huds.) Hepp.
25. *Lecanora muralis* (Schreb.) Schær.
26. *tartarea* (L.) Ach.
27. *subfusca* (L.) Ach.
28. *cinerea* (L.) Ach.
29. *cervina f clavis* DC.
30. *Rinodina sophodes*, var. *confragosa*, Nyl.
31. *Pertusaria pertusa* (L.) Ach.
32. *globularis** Ach.
33. *Cladonia alcicornis* Fr.
34. *furcata* (Huds.) Fr.
35. *squamosa*, var. *cæspiticia* Nyl.
36. *rangiferina* (L.) Hoffm.
37. *uncialis* (L.) Fr.
38. *Biatora rufo-nigra* Tuck.
39. *parvifolia* Pers.
40. *exigua* (Chaub.) Fr.
41. *rubella* (Ehrh.) Rabenh.
42. *chlorosticta* Tuck.
43. *Lecidea enteroleuca* Ach.
44. *tessellina* Tuck.
45. *Buellia lactea* Mass.
46. *atro-alba*, var. *chlorospora* Nyl.
47. *Opegrapha vulgata* (Ach.) Nyl.
48. *Graphis scripta* (L.) Ach.
49. *Arthonia punctiformis* Ach.
50. *tædiosa* Nyl.
51. *Mycoporum pycnocarpum* Nyl.
52. *Calicium populneum*† De Brogn.
53. *Calicium tubiforme* Mass.—Parasitic on *Pertusaria pertusa* on rocks.
54. *Endocarpa miniatum* (L.) Schær., and var. *Manitense* Tuck.
55. *Endocarpon hepaticum* Ach.
56. *Sagedia Laureri* (Flot.) Tuck.—On rocks.
57. *Staurothele diffractella* (Nyl.) Tuck.
58. *Sagedia Cestrensis* Tuck
59. *Verrucaria fuscella* Fr.
60. *rupestris* Schrad.
61. *Pyrenula glabrata* (Ach.) Mass.

W.

*Perhaps this species is only a form of *P. leioplaca*.

†This species has not before been found in this country, except, perhaps, in a very scanty specimen from New Bedford. The specimen is scanty, and, perhaps, not altogether certain.

Mortality among Hickories.—Being in Lisle, Illinois, in September, I was told that the hickories, the "bitternut" and the "shagbark," had been gradually dying for several years, and I saw many dead trees to confirm the statement. Has this mortality been observed to prevail extensively at the West, and has any cause been assigned for it? W.

A few responses to Mr. Coleman's query in the Jan. No. of Vol. III., page 7.—*Changes in Vegetation.*—It would be a good service to vegetable biology if any who have "authentic" facts in regard to the long continued vitality of seeds, would kindly respond to Mr. Coleman's request, and communicate. I have watched for many years, and have seen no account that went beyond a mere guess. The "mummy wheat" is but an Egyptian trick. Mr. Ernst's Caraccas experience, which was recently given in European periodicals, can be accounted for in other ways than on the "large vitality" guess which he offers. The strongest case is thought to be the *Glaucium* at the Laurentian mines, where a "new species" turned up from under the buried scoriæ of a thousand years. But we must remember that in countries where they will make you a

hundred species out of our common *Draba verna*, it is hardly necessary to go back so many ages for a new species of *Glaucium*. Many of the countries of Europe have not been as well explored as our own, though so much older, and it is quite as likely that that "species" would be found somewhere within a hundred miles or so, as that it came from seed that had been buried in the earth for hundreds of years.

Near me, a few years ago, a street was being graded, and pure brick clay from six feet below the surface was spread over contiguous ground. Quite a quantity of *Ambrosia artemisiæfolia* appeared on it, and I was asked: "Where did the seed come from if it had not been in the ground for hundreds of years?" The asking of that question does not prove the antiquity of the seed. I thought I would get better proof. I took earth from six inches, one foot, two feet, and four feet beneath the surface, and put each lot in separate glass jars of water. After a long and careful stirring, the mud was allowed to settle. The vegetable remains formed the upper course, the clay being the heaviest sinking to the bottom. The results were interesting in many respects, but I may say briefly that there was no sign of any seed whatever after getting one foot below the surface, and at six inches most of the remains were but the mere shells of dead seeds.

I am satisfied that if those who think seeds are "in the ground" waiting a chance to grow, especially such large seeds as oaks, pines, hazel nuts, and so forth, will try this easy and simple plan, they will not take "where do the trees come from?" to mean that the seeds have been for a long time in the ground. In former papers, in other places, I have shown where the plants often do come from; but it is not necessary to repeat those observations now.—Thomas Meehan.

"*Whence the Seeds?*"—An important incident is narrated in the Plattsburg Republican of Sept. 1st, 1877, by Mr. O. S. Phelps of Essex county, N. Y., which has such a direct bearing upon the answer to the question proposed by Mr. Coleman in his communication to the January number of the Gazette, that it seems worthy of repetition. Though Mr. Phelps makes no claim to botanical knowledge he is a close and intelligent observer of nature. The incident came under his own observation and is substantially thus:

Many years ago the timber was cleared from a piece of land and a log fence was built along one side of this clearing. In a little time raspberry plants (*Rubus strigosus*) made their appearance along this fence and gradually increased in numbers till a continuous hedge of them skirted its entire length. But the clearing was neglected and in a few years a second crop of trees and shrubs had sprung up, which soon overtopped the raspberries and "*run them out*," in other words, destroyed them by depriving them of the necessary sunlight. Twenty-five years passed away and this second crop of timber was cut, the land was again cleared, burned over and planted. Behold what followed! At midsummer a dense crop of young raspberry shoots had sprung up all along the line of the old log fence, marking its former position and showing every crook and turn in its direction. Whence the seeds? Evidently they had been dropped there by the old hedge-row of a quarter of a century before, and had lain there buried under fallen leaves and decaying vegetable matter, waiting for the quickening influences of the sun's rays to call their latent powers into activity and cause them to germinate and grow.—Chas. H. Peck.

"*Where do the seeds come from?*"—The probability is, that in most cases, the wind and animals are the transporters of the seed. The blue-jay is particularly active in storing seeds in and about trees and rocks. Wood-chucks and squirrels are also industrious workers in this line. The agency of insects should not be overlooked; ants are generous providers and keep their graneries well filled. Of course all this transportation is not accomplished without much waste by the way-side, and even the store

houses themselves may overflow, or be broken into and their contents scattered. That one kind of plant should supersede another, or that one kind should grow so vigorously as to choke out all others, is merely an illustration of the "survival of the fittest." —Mrs. J. M. Milligan.

Some large Walnuts.—In the Gazette I see notes occasionally of unusually large growths. The following may be of interest in this connection. A small *Juglans nigra*, about six inches in diameter and about twenty feet high, bore three pecks of fruit, which average near 11½ inches in circumference, and 10¾ ounces in weight. The tree grows in a field, and has no unusual appearance, except the fruit, which looks more like that of the Osage Orange.—Dr. J. Schneck, *Mt. Carmel, Ill.*

The Range of the common Huckelberry in Missouri.—The common huckelberry is not found north of a certain N. E. and S. W. line. Its northern extension is a follows: I have found it on Cuivre bluffs near Troy, Lincoln Co.; also in the northwest part of St. Charles county; on Missouri bluffs as far west as Jefferson City; near Versailles in Morgan county; at Clinton, in Henry county; and in Jasper county; thence it passes southwestward. It is invariably found on either flinty or sandy soil, or where there is but little soil. It abounds chiefly in the pine region of South-eastern Missouri. —Prof. G. C. Broadhead.

Some new stations.—The neighboring county of Clark bids fair to equal Jefferson in the number of its good plants. When it is thoroughly worked up we hope to be able to report many rare things, but those enumerated below are worthy of special mention. While doing some field work last May with one of the College classes, Mr. Chas. R. Barnes called my attention to an odd little Crucifer clinging to the edges of some shaly limestone bluffs. The plant seemed to have suppressed every other part for the benefit of its enormous pods, which were more than half as long as all the rest, and a much more noticeable object than the inconspicuous lyrate root leaves. The little stranger proved to be *Leavenworthia Michauxii*, Torr., growing there in sufficient abundance to satisfy the rapacity of even a botanist possessed of the mania for exchanging. Within a few miles of the above, later in the season, Mr. John F. Baird, collected some fine specimens of *Sullivantia Ohionis*, T. & G., and reported that it was growing in greater abundance even than at Clifty Falls, the habitat of specimens that are to be found in very many of the herbaria of the land. Of course it was growing upon damp limestone cliffs, sending its roots down into the soft, spongy moss. Mr. Baird also collected specimens of *Cleome pungens*, Willd., that to all appearances were perfectly naturalized.—J. M. C.

Botanical Excursions, No. 1, by J. G. Lemmon.—The Great Basin.—The great basin of America is the bed of the evaporated Mediterranean sea of the western continent. Situated on the same parallels as its Eastern prototype, bordered like that on all sides with high ranges of mountains, it differs from it in two particulars, which render the one a very salt sea and the other a very salty desert.

The Mediterranean sea fills a deep chasm in the earth's crust 2,000 to 6,000 feet deep; lying between 30 deg. and 46 deg. north lat., and almost constantly swept by the dry winds of the great Sahara, its waters are evaporated at an immense rate, which would, ages ago, have emptied its basin but for the other important fact, the Strait of Gibraltar, through which a strong current ever comes from the ocean; and this, in addition to the mighty rivers which empty into the sea, and all to restore the equilibrium disturbed by evaporation. To this evaporation—this lifting of a sea into the air—is Europe indebted, mainly, for its exceeding fertility. The dry South wind is a sponge which takes up the waters of the Mediterranean and, condensed by the cold summits of the mountains of Europe, showers its waters over the plains. To this fact also is due the intense saltiness of the Mediterranean, for salt is the residuum of evaporation.

The Mediterranean desert of America is elevated about 5,000 feet above the ocean, so its waters would naturally sink in the earth. Then there are no mighty rivers feeding it, much less a Gibraltar strait, bringing in a flood from a neighboring ocean.

The towering rim of mountains on the West prevents the moist winds of the Pacific from entering the basin; the lofty Eastern rim bars out the Gulf winds; the lower North and South rims admit only the hot, dry, South winds of the Colorado to sweep over the basin, absorbing at their founts the few meager springs that rise at the mountain borders; so we have an immense frying pan or bake oven, as if scooped out of the highest mountains of North America.

It is oblong-elliptical in shape. Its western end rests upon the snow-clad Sierra, the eastern upon the lofty Wasatch range—a spur of the Rocky Mountains. On its smooth bottom are ranged, side by side, steep ranges of mountains running north and south, like cross-bars of a gridiron. The highest of these, the Humboldt range, divides the basin exactly in the center, and the short rivers running from the mountains on all sides form sinks or salt lakes in each end, to which numerous systems of hot springs add alkali, sulphur and other minerals, so that the sinks are generally extremely offensive.

The most important rivers of the eastern depression are Bear river, on the north, and Sevier on the south, each emptying respectively into Great Salt Lake and Lake Sevier. The rivers of the west end are Humboldt and Susan on the north, debouching respectively into Humboldt sink and Honey lake; and Walker, Carson and Truckee on the south, filling respectively Walker, Carson and Pyramid lakes—the latter of which we propose to visit.

And now, dear readers, you must allow me the privilege of walking, to gather and study the plants by the way. See here, before getting out of Sierra valley, what beautiful specimens of the four new *Astragali*, viz: *A. Lemmoni*, *A. Pulsiferæ*, *A. Webberi* and *A.* (unnamed), each particularly abundant along the bottom and sides of Beckworth pass, as if the seeds were sown here by the water current surging through here ages ago.

FLORA OF THE GREAT BASIN.

Emerging through this cleft in the high Sierra, and coming into full view of the shimmering basin below, with the snow-tipped Humboldts in the distance, I will leave you to contemplate the scene, while I pick up this desert plumb, *Prunus Andersoni*, this worm bush *Sarcobatus vermiculatus*, the first of the desert plants met with on the down grade.

Here on the floor of the basin, radiant with beauty, grows the only plant Dr. Gray will allow named for him on the western continent, *Grayia polygaloides*. It is a bush two to five feet high, densely crowded with spikes of flat circular pods, half as large as five cent coins and red as cherries; "neat but not gaudy," is the Doctor's apt description.

A large part of the flora of the basin belongs to the order of *Chenopods*, or the goose-foot family, distinguished by their thick, hairy, succulent leaves, often shiny stems, and the extreme loneliness of the entire order, with the exception of the *Grayia* mentioned. The order most numerous is the one everywhere most abundant, found on every spot where vascular plants may thrive, the immense order of *Compositæ*, or sunflowers. This order comprises about 10,000 species, and forms, according to Humboldt, one-ninth of all the flowering plants of the globe and one-half of its tropical flora.

Chief among this order in the basin is the renowned "sage brush," a name loosely applied to several kinds of plants having the same ashen hue, and found on the great arid plains from the forest-clothed slopes of the Sierra to the bottom lands of the Missouri.

Whatever the order or genus, all is modified to conform to the requisites of this hot region; thick leaves to hold the moisture when the sun is high; copious, non-conducting hairs, to prevent exhalation; sharp, forbidding spines, to ward off enemies of the animal kingdom. This spinescent character is most puzzling to the reflecting mind. What need of such protection in a region so desolate, so unfrequented? The rich open prairies and forests of other lands invite population. This arid, seemingly waterless basin is clothed, except where bleak alkali and salt deserts prevail, with dense, thorny, almost impassable sage brush, as if to guard a priceless treasure. And Darwin says it is so. He affirms that here are reservoirs of elements now unfit for use, which the art of the coming man will turn into verdant forests or beautiful fields, as the needs of a teeming population will demand. Corroborative of this theory, most wonderful vegetable growths are now seen in the valley of the Jordan, tilled by the devoted Mormon, and in the valley of the Carson, verdant with alfalfa; both of these valleys immensely changed in value as the result of irrigation skillfully applied on a large scale. But I must hurry up or you will leave me pondering here in the sand.

The first of the valleys between the cross-bars of the gridiron is Long valley, threaded in winter and spring by Long Valley creek, rising near Reno and running north to Honey lake. Passing down it 25 miles we turn eastward through a cattle range enclosed by a fence of matted willows, climb the first ridge and Soda Lake valley is before us. The lake is a yellow pool of salt, alkali and sulphur. Crossing to the second ridge and climbing it, we look over into Winnemucca valley. On the pass at our feet is a beautiful *Scutellaria nana* (Gray), a new species. It maintains its green, robust look by means of reservoirs of plant food stored in its thick, necklace-like, subterranean stems. The next is Warm Spring valley, quite large and important. Through it passes the road from Reno to Surprise valley and Fort Bidwell. Passing around a sand mountain, gemmed with rare *Œnotheras*, we ascend an arm of Warm Spring valley, move over a high pass and drop into a valley so walled in with sheltering ridges as to afford a surprisingly large and varied flora.

Every mile of our progress to this point has been marked by decreasing verdure and the appearance of the peculiar ashen, dwarfed, desert plants. But here in this little valley all the species met with on the way are crowded, while hosts of strangers appear. In rapture, I named it for the veteran botanist,

GRAY'S VALLEY.

Here in this secluded garden of the great basin is the natural home of the sand and sun-loving plants, too numerous to name—all putting on their gayest apparel and exhaling the richest perfumes, as if to prove the oft-quoted lines:

> Full many a flower is born to blush unseen
> And waste its sweetness on the desert air.

Here flourishes *Tetradymia spinosa*, with strong, hooked prickles; the monster *Thelpodium*, four to six feet high. Up on the hot sand bluffs stands, sentry-like, the scrubby crucifer *Stanleya pinnatifida*, with spikes of yellow flowers 18 inches long, terminating upright; white limbs four to six feet high. On the clean sand by our feet nestles the curious *Coldenia nuttallii*, the purple *Comanthus aretioides*, the yellow *Emmeranthe glandulifera*, the snake-head like *Anisocoma acaule* and several species of the ever beautiful *Œnotheras*; but most striking of all uprears the rare *Abronia Crux-Maltæ* of Dr. Kellogg, holding at arm's length its large balls of pink flowers. Over the dry water-course, *Cleome lutea* peers; from the rocks on each hand hang *Pentstemons* and *Arenarias*, while the gorgeous *Eschscholtzia* shows its red eyes between the clefts, and the immortal *Lewisia rediviva* on the gravel above aspires to notice by creeping to the edge of the precipice.

This plant is well named *rediviva*. Roots gathered nearly two years ago are growing still in their papers despite heavy pressure, illustrating the power with which they

are endowed to resist the severities of the basin climate. Deep rooted in the volcanic ashes of yonder bench glows *Opuntia pulchella*, the prettiest of the *Cacti* family, and that odd little stiff-leaved, crimson *Oxytheca perfoliata*. Under the spiny bushes of *Bigelovia graveolens* carpeting the whole valley, are seen a few plants of *Pectocarrya penicillata* strayed away from the coast, and *Blitum carinatum*, only found before in Australia.

Recent Publications.—*American Journal of Science and Arts*, January Dr. Gray gives a review of Darwin's late work on "The Different Forms of Flowers on Plants of the same Species." This paper came to hand most aptly just as we had finished reading the book. Dr. Gray, of course, does not mention that the work was dedicated to him, but so it is, and we are glad of it, for it is a deserved compliment. It was refreshing to see all through the book the notice that was taken of American botanists, for it is a sign that they are not all completely absored in Systematic Botany, which, in a country comparatively new, very justly has a controlling interest, but are beginning to study life histories. Dr. Gray adds another genus and natural order to the list of cleistogamous flowers. Mr. C. G. Pringle, of Charlotte, Vermont, has found excellent examples of cleistogamous flowers in *Dalibarda repens*, of the order *Rosaceæ*. Mr. Pringle also announces the discovery of cleistogamous flowers regularly occurring within the leaf-sheaths of *Danthonia spicata* and its allies, also in *Vilfa* and other grasses. Mr. Darwin adopts Hildebrand's term of *heterostyled*, instead of *heterogone* or *heterogonous* suggested by Dr. Gray. The first six chapters "relate to di-morpheus blossoms, such as those of Primrose and *Houstonia*, including also the trimorphic cases, as of *Lythrum Salicaria* and some species of *Oxalis*. The seventh chapter discusses Polygamous, Dioecious, and Gyno-Dioecious Plants; the eighth and closing chapter is devoted to Cleistogamous Flowers."

American Naturalist, January.—The botanical notes are "Notes on the Alpine Flora of Mt. Shasta," and "Production of Apples in 'off' Years," both by Dr. A. S. Packard. The Naturalist comes for the first time from Phildelphia, from the press of McCalla & Staveley. The press work is as fine if not finer than ever, and under the editorial management of Dr. A. S. Packard, Jr., and Prof. E. D. Cope, it promises to its patrons everything needed in a journal devoted to Natural Sciences. In looking over the different departments, we see them all in the hands of specialists except Botany. It is hard, even for a journal devoted to natural sciences in their widest sense, not to become special in its tendency. It would require wonderful skill and self-denial for two such eminet Zoologists as Dr. Packard and Prof. Cope not to throw the weight of their favor on the side of Zoology. We are not decrying Zoology, for next to Botany it has a warmer place in our affections than anything else, but we are asking for a fair representation.

Bulletin of the Torrey Botanical Club, November, December and January.—The November number is filled by a contribution from Francis Wolle. He gives a list of Fresh Water Algæ, the work of the past twelve months. It contains 150 forms new to the United States and 24 new to science. Two new genera also are described. In the December No. a new species of *Danthonia* is described by C. F. Austin, and named for its discoverer, *D. Faxoni*. The species is allied to *D. spicata*, and was found at the Notch of the White Mts., N. H. Mr. Davenport describes a new *Cheilanthes* found in California, and names it *C. viscida*. The species seems intermediate between *C. vestita* and *C. Cooperæ* and will be figured in an early number of the "Illustrations of the Ferns of North America." In the January number we note Mr. Geo. E. Davenport's valuable contrintion on "Vernation in Botrychia, with special reference to its importance as a means for distinguishing the different species." The different species of *Botrychium* have so long been puzzles to botanists that Mr. Davenport has tried to

establish them upon characters that would be unmistakable and invariable. He has found these characters in the buds and spores. As the characters depending on the spores can be determined only by very high microscopical power, in the present paper he describes the buds. An accompanying plate, with figures drawn by M J. H. Emerton, renders the descriptions very plain and easy to follow. With this number the Bulletin began its ninth year of publication, and we wish it long life and success. It consists of four or more pages monthly. The price is one dollar per annum, in advance. Address Wm. A. Leggett, 54 East 81st Street, N. Y. City

Science Observer, January.—This journal is printed at Boston by the Boston Amateur Society. Its subscription price is fifty cents per annum. It consists of eight pages and a cover. Address Science Observer, Box 2,725, Boston.

The Gardener's Monthly, January.—We are always at a loss what to note in this journal. It is so full of facts, that to select one would seem to slight others. Of course the part pertaining strictly to gardeners we can legitimately pass over, as it does not belong to our province. But botanists too, have a corner, and a good large one, for Mr. Thos. Meehan is a scientific botanist as his frequent contributions to the Proceedings of the Phila. Acad. of Nat. Sci., will show.

The Valley Naturalist, January.—The first number of this monthly is before us. It is published at St. Louis, Mo., by Henry Skaer, 1,213 South 6th St. The subscription price is fifty cents per annum, and its object is to aid the diffusion of natural science in a popular form. The present number has its departments of Entomology, Botany, Ornithology and Conchology well represented.

Botanical Index, January.—Published by L. B. Case at Richmond, Ind. With the number before us the Index begins its second year of existence. It contains 12 pages or more of matter devoted to Floriculture and Horticulture. It is well illustrated and certainly deserves the patronage of all amateur gardeners or florists. The subscription price of the Index is 50 cents per year.

Silurian Plants, by Leo Lesquereux.—Read before the American Phil. Soc., Oct. 19, 1877. The author describes in this paper five new species of land plants recently discovered in the Silurian rocks of the United States, one of them belonging to a new genus. "The discovery, an important one for the Natural History of this country, was recorded in the Am. Jour. of Science and Arts, Jan. 1874, p. 31, and the remains, representing two fragments of stems and branches, were briefly described at the same time." Now for the first time the plants are fully described. A branch of a fern has been recently obtained from the Silurian Schists or Slates of Angers, France, but this important discovery of land plants in the Silurian was forestalled in America. "It is a remarkable fact that the character of these Silurian plants gives us a microcosmical representation of the flora of the Carboniferons, so simple and at the same time so admirable in the multiple sub-divisions of its specific forms." We now have represented in the Silurian the *Lycopodiaceæ*; the Ferns; the *Calamariæ*, representing Cryptogamous acrogens like the ferns; the *Sigillariæ*, or representatives of the Phænogamous gymnosperm. "When *Cordaites* (now considered Conifers) are found in Silurian beds (a probable discovery, for they have been found abundant in the Devonian,) we shall have all the essential types of the plants of the Carboniferous flora already represented in the oldest paleozoic times." Mr. Lesquereux also describes a fungus found in the shales of the Darlington Coal bed at Cannelton, Penn "This discovery" the author remarks, "is not less remarkable than that of land plants in the Silurian."

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EUCALYPTUS GLOBULUS.—Having been led to raise the *E. globulus* from seed for experimental purposes, the last summer, the plant afforded opportunities for some quite interesting observations. This tree is not only remarkable for its rapid growth when young, but equally so for some curious eccentricities of character. To those familiar with the growing "Blue Gum," probably these observations are not new; but to the readers generally of the GAZETTE, they will prove interesting, as they certainly were to the writer. Sown in March, in a flower-pot in the sitting room, the seeds pushed up each a pair of bright red cotyledons. The young tree, even when of respectable height, say 15 feet, presents a crowd of specific differences, as species in plants are to-day determined. There would be no difficulty with a young "Blue Gum" on his table, for the teaching botanist to illustrate a variety of leaf characteristics, considered constant and as specific distinctions in other genera. And when the flowering age comes, the adult tree demurely abandons these early inconstancies. In thrifty growing specimens, the young *E. globulus* has a four-sided stem like the labiates, with sharp thin extensions at the corners. The leaves like those of our own deciduous trees, present the upper side to the sunlight, with one side, as a matter of course in the shade. They are sessile, with the base notched or heart-shaped, and they are opposite, thus the ears or lobes of the notch of one leaf lap or lie upon the corresponding parts of its fellow opposite, looking at a little distance as if they might be perfoliate, much as appear the upper leaves of the *Lonicera* or Woodbine. Now in the adult tree the leaves are long petiolate, and very long lanceolate. They are also alternate, and to crown the eccentricity of habit, they are arranged edgewise to the sun-light; that is, the upper and the under plane of the leaf are equally exposed to the sun. In dried specimens before me from Santa Barbara, Cal., I find that these great lanceolate leaves are decidedly falcate, and the queer thing is that the concave edges of these scythe-like leaves, are invariably set uppermost. It is observable, too, that while the leaves of the young individuals are glabrous and dark green above, and the undersides are pale, and a little glaucescent, and the mid rib is of course most prominent below, and the resin glands most conspicuous there these conditions disappear in the leaves of the older tree. Now the glabrous-green has gone and both sides of the leaf are of a whitish hue, and the glands are equally discernable on either side—and strange indeed! the mid-rib and the cardinal veins are nearly equally prominent on either side of the leaf.

The growth of this Blue Gum is truly astonishing. In May of this year Dr. R. E. Kunze, of New York, set a plant two feet high, taken from a conservatory, in his back yard. On the 10th of October it was about 12 feet high! Allowing the proper time for it to rally from the shock of transplanting and change of place, it must have averaged an inch of growth per day.—SAMUEL LOCKWOOD, *Freehold, N. J.*

BRYOLOGICAL NOTES. By C. F. AUSTIN.—TRICHOSTOMUM ? SUBDENTICULATUM, *n. sp.*—Humile, fusco-viride; foliis siccitate involuto-crispatis humiditate patentibus e basi angustata canaliculata caulem ad $\frac{3}{4}$-amplectente late elliptico-oblongis non nullis convoluto-concavis aliis planiusculis, margine nec recurva nec crenulata versus basin late undulata versus apicem obtuse mucronatem minutissime denticulata, dorso minutissime papilloso, costa valida flavescente vel subrufa lævi percurrente,

cellulis minutissimis subnitidis (vix granulosis) rotundo-quadratis, basilaribus majoribus magis minusve pellucidis (sæpe (?) subfuscis): cætera ignota.

With *Tortula agraria* and *T. Donnelli*, on shell banks, in the Everglades of Florida, March, 1877, *J. Donnell Smith*.

The most striking characteristics of this moss are its short stems, broadly elliptico- or lanceolate-oblong obtusely mucronate leaves from a much narrowed pellucid almost vaginal base, with the margins somewhat undulate (at least towards the base), some nearly plane, others strongly convolute-concave above, immarginate, neither recurved nor papillose-crenulate on the margin, remotely and minutely denticulate towards the apex, very minutely and closely papillose on the back, costa stout, smooth and percurrent, cells at the base considerably enlarged, the ordinary ones most minute and scarcely granulose.—Possibly a species of *Tortula*; but apparently allied to *Trichostomum* (*Didymodon*) *riparium* (*Pottia riparia*, Aust Musc. Appalach.); but that has the leaf never so strongly concave, with a shorter less clasping base, a more distinctly dentate or often coarsely serrate apex, the back less closely papillose, cells twice as large,—the basilar ones less pellucid; color more brown, &c.

The following additional notes were made in comparing with other species:

Tortula agraria, Hedw., is a little smaller, with the leaves more spatulate, more acute, composed of larger cells, &c. Cells of the leaf quadrate, not granulose nor opake, distinctly defined, the basilar ones considerably enlarged and truncate; perichætial leaves (2) scarcely convolute, oblong or lanceolate-ovate, acutish, heavily costate; outer capsule-wall composed of rather large and broad cells; peristomal teeth flattish (*tæniate*), with a pellucid medial line, papillose, much twisted, dark red; stems very short. A small species.

Tortula Rauei, Aust. (Torr. Club Bull. VI., p. 43,) is nearest to *T. agraria*; but the leaf is more ovate, much more concave, more crisped when dry, more acute; cells opake and granulose, less quadrate,—the basilar ones more enlarged, less truncate at both ends; perichætial leaves thinner, broader, strongly convolute, often obtuse, very lightly (or even obsoletely) costate; outer wall of the capsule composed of smaller and narrower cells; peristomal teeth terrete, without a medial line.

T. cæspitosa, Hedw. has the leaf granulose, more undulate, cells larger and each bearing 2 or more papillæ on its back, the papillæ projecting beyond the otherwise entire margin, thereby giving it a crenulated appearance.

Calymperes Richardi, C. M. has somewhat narrower leaves, which are broadly margined towards the base, the margins above involute and entire; basilar cells much larger and more hyaline and extending much farther up the leaf; ordinary leaf-cells a trifle larger, more acutely angular, closer, and when viewed under the microscope with transmitted light they exhibit a single papilla on the back of each as a minute shining speck.

Tortula recurrifolia, Schimp.—I found a few stems of this species, mixed with *T. intermedia* (Brid.) in crevices of rocks near the Weehawken Oil Docks, N. J., and also at Suffern, N. Y., in 1866. Messrs. Wölle and Rau and myself found it in Watkin's Glen, and I also found it at Niagara Falls, in 1874. Some one, Mr. Warne, I think, has sent it to me from Colorado, and both Mr. Macoun and Mrs. Roy have sent it from Canada. The Canada specimens are very small and slender, with the leaves short and mostly not recurved. All the specimens are sterile.

Tortula Closteri, Aust., (in Bot. Gazette, I., p. 29,) is characterized by its sublinear, or oblong-lanceolate subcarinate remarkably granulose leaves, very slightly recurved on one of the margins below the middle, with a minute hyaline apiculus; apex of the leaf often strongly recurved.—Closter and Camden, New Jersey. Also, Gainesville, Florida, *Ravenel*. Very rare; sterile.

Tortula Donnellii, *n. sp.*—Dioica, parvula, gregario-cæspitosa; caule 1–2 lineas alto nonnullo sub gracili, foliis sicitate valde involuto-crispatis in humore subpatentibus subspathulatis oblongo- junioribus -ovatis senioribus-lanceolatis acutinsculis et acutis submucronatis profunde canaliculato-concavis (senioribus subcarinatis), dorso scabriusculo, facie interiore ob cellulas prominulas subpapillosa, margine erecto-involuto (sæpe in medio adspectu incrassato) haud limbato apice minute obsoleteve serrulata, costa valida percurrente sublævi, cellulis perminutis rotundo-quadratis haud granulosis, illis in foliis junioribus homogenis, basilaribus in senioribus longioribus vix latioribus paulo pellucidioribus: fructu et pl. masc. ignota.

Banks of the St. Lucie River (with *T. agraria*), *John Donnell Smith.*

About the size of *T. agraria* and *T. Rauei*, and not readily distinguished from them; but they both have shorter stems, with the male and female plants growing together, broader more spatulate, more acute, less concave leaves, composed of larger cells, the basilar ones much broader and more pellucid. Furthermore, the former is distinguished by its leaves being but slightly crisped when dry; and the latter by its granulose leaves.

Grimmia subincurva, *n. sp.*—Caule erecto compacte cæspitoso simplici vel apicem versus furcato, foliis subconformibus indistincte spiraliter tristichio siccitate tortilibus madefacte erecto-apertis ovatis et ovato-lanceolatis canaliculato-carinatis lævibus, apice angusto mutico subincurvo, margine plano vel hic illic anguste recurvo, costa mediocri percurrente, cellulis parvis haud granulosis illis versus apicem subquadratis illis a medio versus basin paulo latioribus sesquiquadruplo longioribus paulo pellucidioribus haud sinuosis: cætera ignota.

On rocks, Colorado, *Brandegee* (*Rau*).

Size (small) and mode of growth much as in *G. conferta*; but that has the leaf usually hyaline-apiculate, or often shortly piliferous, margin more recurved, cells smaller, those below much smaller and less elongated. Color and general appearance of *Zygodon Mongeotii* with which it was found growing, but from which it is readily separated by its much shorter obtusish not granulose leaves, composed of larger cells, those below more elongated, &c.—The species is chiefly characterized by the mutic, subincurved apex of the leaf. Cells in the upper part of the leaf often broader than long, slightly obscure.

Hypnum (*Rhynchostegium*) Royæ, *n. sp.*—Dioicum; caule rigido tenui gracili stricto parce ramoso rigido subcompresso, foliis dissitis erectiusculis et semipatentileus ovatis et ovato-lanceolatis acute acuminatis leviter concavis toto margine plana minute serratis ultra medium costatis, cellulis mediocribus ovali- et oblongo-rhombeis lævibus; flore fœm. magna, foliis perichætialibus e basi oblongo-ovata longe subulato-acuminatis ecostatis (exterioribusve leviter costatio), acumine squarroso subserrato, paraphysibus compluribus longis: cætera ignota.

California, *Mrs. Jessie Roy.*

A small species; not larger than the usual forms of *H. serpens*, distingnished by its straight stems, distant erectish leaves, &c.

Hypnum (*Rhynchostegium ?*) Brandegei, *n. sp.*—Dense cæspitosum, aureo-viride, subintens; caule subunciali erecto subsimplici tumidulo compressiusculo, foliis imbricatis late ovatis concavis late 2–3 plicatis abrupte breviuscule subulato vel piliformi-acuminatis, margine plana integerrima obsoleteve serrata, costa simplici vel bicrura vix ultra medium producta, cellulis laxiusculis anguste oblongo-fusiformibus strictiusculis basilaribus paulo latioribus brevibus et brevissimis; cætera ignota.

Colorado, *Mr. Brandegee*, (*Rau*).

Near the European *Hypnum murale*, Hedw.; but that has the leaves rather more concave, always more acuminate (never piliferous), and furnished with a stouter and

longer costa, and with narrower and more vermicular cells. *H. piliferum*, SCHREB., has much longer often subpinnate stems and serrate leaves with a longer pilum and different areolation.

Hypnum Coloradense, AUST., (BOT. GAZETTE, II., p. 111,) is also a somewhat similar moss; but is much more robust, with rather more compressed stems, and oblong-ovate leaves, furnished with a much longer pilum, and composed of much longer and narrower cells.

I have lately received a moss from Mrs. Roy, under the name of "*Hypnum cariosum*," collected in Scotland by Rev. J. Ferguson, which is about the size of *H. Coloradense*, and has the same piliferous and concave leaf; but differs from it, as well as from the other species mentioned above, in having the leaf distinctly auricled, the auricles minute and composed of somewhat inflated cells; the rest of the lowermost alar cells are very minute, subsolid and opake.

There is a compact form of *Hypnum acuminatum*, BEAUV., which occurs abundantly on the roots of trees in woods about Closter, which somewhat resembles H. BRANDEGEI, but it is of a dark green color, the leaves are more plicate, with the apex less abruptly and never piliferously acuminate, the margins more or less recurved and serrate, costa always single, &c.

THE CONIFERÆ OF THE CRESTONES.—The Crestones are pinnacles of rock on the Sangre de Cristo spur of the Rocky Mountains, rising to an elevation of 14,200 feet above sea level The altitude of timber line is about 12,000 feet, but as most of the *Coniferæ* upon the northern slope have been killed, it does not appear so plainly marked as in many parts of the Rocky Mountains. At 10,000 feet altitude, all the *Coniferæ* of Colorado excepting *Juniperus Virginiana* and *occidentalis and Pinus edulis* can be seen growing together. *Abies Engelmanni* is the most abundant tree above 10,500 feet altitude, and *A. concolor* the predominant conifer below that altitude.

Pinus contorta, Dougl., is abundant upon some dry ridges and is generally so small that hardly any of it can be called trees. Its leaves are persistent seven years and its cones very many years. Old dead trees are full of the persistent cones. Nothing but wings of seeds could be found in these old unopened cones.

Pinus ponderosa, Dougl., is found up to 10,000 feet altitude. It bears *Arceuthobium robustum* in great quantities. This pine often throws its parasite-bearing limbs and branches amongst those of other pines and spruces, but the *Arceuthobium* grows only upon those of *P. ponderosa*. Its leaves are persistent six and seven years. The cones begin to open about the first of October, the scales opening first at the base.

Pinus flexilis, James, is not common, but single trees are found scattered about up to an elevation of 11,000 feet. The leaves are persistent three and four years. The seed falls between Sept. 8th and 20th, those growing at low altitudes ripening first. Some seeds near the base of the cone are held in by the scales not opening wide enough to let them fall.

Pinus aristata, Engelm., is common at timber line and like many alpine plants comes down to a lower altitude. Here it is found at 10,000 feet, and west of Pike's Peak I have seen it below 8,000 feet altitude. Trees at 11,000 were beginning to drop their seed Oct. 6th. Its leaves are persistent 12 and 13 years.

Abies Engelmanni Parry. The lower limit of this species is 10,500 feet, but many trees come down to near 9,000 feet, generally, however, growing in shaded situations. The dwarfed, prostrate, cone-bearing trees are plenty at timber line, but the very large magnificent forms of the western slope are not found in the Crestones. It is a very variable species. The branchlets may be either pubescent or smooth and shining, so that it cannot be separated from *A. Menziesii* by this character alone. At higher altitudes the branchlets are always pubescent, but at its lower elevations they are often

smooth. Rarely a tree is cone-bearing upon every branch. The cones vary in color, size and shape, but are always small compared with those of *A. Menziesii*. Almost every tree bears a different variety of cone; sometimes they are not one inch long, sometimes purple, sometimes light colored. They may have the tips of the scales appressed or spreading, and are often oval in shape; often cigar-shaped, and forms connecting the extremes of their variation are abundant. The scales of the cones open wider than those of *A. Menziesii*, and the seed at the same altitude falls a week earlier, beginning before Sept. 15th. Young trees ripen their fruit first, which is true of all our species of *Abies*. On the tree, the scales open first at the tips of the cone, in heaps at the base. In heaps they give up their seed very much more readily than *A. Menziesii*. The average yield of seed to a tree is one-quarter of a pound. The difference between this species and *A. Menziesii* in the rigidity of the leaves growing with the cones is pleasantly noticeable to one picking the cones. The leaves in all species of Colorado *Abies* are persistent 12 and 13 years. This species forms buds along the annual growths, so that the young trees do not have the regularity of growth of *A. Menziesii*. It is always readily distinguished from the latter by its smooth scaly bark.

Abies Menziesii, Lindl., is not plenty in the Sangre de Cristo. It grows along the streams and in damp localities up to its highest altitude—10,000 feet. The branchlets are smooth and shining, but sometimes show a decided tendency to pubescence. The horizontal limbs of old trees are crowded with small drooping branches, which so well mark a grove of these trees that they can be distinguished many miles distant. The scales of the green cones are free at their tips; the cone is long conical-shaped. Young trees begin to ripen their seed Sept. 15th. The average yield of seed is one-half pound to a tree.

Abies subalpina, Engelm., (*A. grandis* of the Colorado botanists, not of Douglass. *A. lasiocarpa*, Hook. Flor?) This conifer comes down to below 10,000 feet altitude, but is most common at high elevations. The trees are small and slender, never equaling those of the western slope of the Rocky Mountains. The cones are few, always dark purple in color, and fall to pieces before October 1st. There are two varieties: one bearing many short leaves, the other bearing fewer long spreading leaves. Growing with *A. concolor*, it is readily distinguished by its smoother, white bark, its shorter less falcate leaves and more slender form of growth. The wood is soft and the heart wood slightly darker.

Abies concolor, Lindl., grows upon ridges, slopes, rocks and along the creeks up to 11,000 feet altitude. The main trunk of the tree often is divided and branched near the top. Old trees have a very rough, ridged bark. At higher elevations the bark becomes smoother, but can not be mistaken for that of *A. subalpina*. It bears many cones and is often cone-bearing to the middle of the tree. The cones are of two colors: about half the trees bearing apple-green cones and the others cones of a dark purple color. There are two varieties as to leaves, but not associated with any one color of cone: one variety with the leaves short, crowded, turning upward, the other with long, spreading leaves corresponding to the two varieties of *A. subalpina*. The yield of seed is about one pound to a tree. The cones begin to break up September 20th.

A. Douglasii, Lindl., grows upon the ridges as high as 11,000 feet. Out of one hundred trees chopped, ninety-eight fell toward the east. One very small one was pushed westward by main strength, and the other had such a crooked trunk that it could not possibly fall eastward. The cones are nearly all borne upon the east side of the tree. Trees that are in fruit this year were also in fruit last year, which was not generally the case with the other species of *Abies*. The cones begin to open September 25th; large trees bear about one-twelfth of a pound of seed. Half of the cones are stung by insects.

Juniperus communis, L., var. *alpina*, L., is plenty at all altitudes and is full of fruit. —T. S. Brandegee, *Canon City, Colorado.*

COLORADO FUNGI. (NEW SPECIES.)—BY CHAS. H. PECK.—The species of fungi here described were collected in Colorado by *Mr. T. S. Brandegee*, and forwarded to me for examination by *Mr. E. S. Rau*, of Bethlehem, Pennsylvania.

SPHÆROPSIS RAUI, *Pk.*—Spots indefinite, brown; perithecia numerous, gregarious, minute, phomatoid, sub-membranaceous, black, .006–.007 inch in diameter; spores obovate or oblong, colorless, .00065–.00075 inch long.

Living leaves of *Artemisia scopulorum*, Gray.

LECYTHEA SPECIOSA, *Pk.*—Spots suborbicular, one to two lines in diameter, yellow; sori few, crowded, prominent, hypophyllous, orange-colored; abortive spores elongated, curved, obtuse, nearly cylindrical; spores sublogose or elliptical, .001–.0012 inch long, rough, the endochrome bright orange.

Living leaves of *Rubus deliciosus*, Torr.

This is probably the early or Uredo form of some species of Phragmidium which should be sought later in the season. It is distinguished from its allies by the deep orange color of the sori, and the narrow elongated abortive spores.

ÆCIDIUM BRANDEGEI, *Pk.*—Peridia amphigenous, scattered or aggregated, sometimes seriately placed, elongated; spores subglobose, orange colored, .0008–.001 inch in diameter.

Living stems and leaves of *Asclepias verticillata*, L.

The peridia resemble those of *Æ. Thalictri*, but the spores and habit of the plant are quite different. It occupies the stem and leaves in patches of considerable extent and changes the aspect of the host plant.

ÆCIDIUM HEMISPHÆRICUM, *Pk.*—Peridia prominent, scattered or crowded, hemispherical, opening by a small aperture; spores orange, subglobose or elliptical, .0008–.001 inch long, the epispore thick, hyaline.

Living stems and leaves of *Mulgedium pulchellum*, Nutt.

The peridia are generally more scattered on the stem than on the leaves, the whole lower surface of which is often occupied by them.

ÆCIDIUM POROSUM, *Pk.*—Spots none; cups crowded, deep-seated, broad, wide-mouthed, occupying the whole lower surface of the leaf to which they give a porous appearance; spores orange-colored, sub-angular, .0008–.001 inch in length.

Living leaves of *Vicia Americana*, Muhl.

This species is quite distinct, both in its spores and in the size and character of the peridia, from *Æ. album*, Clinton, which also inhabits *Vicia Americana*.

ÆCIDIUM ABUNDANS, *Pk.*—Spots yellow, numerous, small, sub-orbicular, sometimes confluent; peridia few, hypophyllous, sub-circinating, pustulate; spores sub-globose, orange, .001 inch in diameter; spermogonia on both sides of the leaf on the same or on different spots.

Living leaves of *Symphoricarpus orcophilus*.

The leaves of the host plant are beautifully mottled by the spots. The peridia in the specimens seen are nearly all closed, from which it is probable that they are scarcely mature.

ÆCIDIUM BIGELOVIÆ, *Pk.*—Spots thickened, yellow; peridia pustulate, hemispherical, opening by a small aperture; spores sub-globose, bright yellow or orange, .001–.0013 inch in diameter.

Living stems and leaves of *Bigelovia Douglasii*, Gray.

The peridia resemble those of *Æ. hemisphæricum*, but the species is at once distinguished by the yellow spots and larger spores.

UROMYCES HYALINUS, *Pk.*—Spots none; sori numerous, hypophyllous, at first covered by the hyaline membranous epidermis, at length exposed, effused, nearly or quite

occupying the whole lower surface of the leaf, ferruginous-brown; spores ovate or oblong-ovate, umbonate at the apex, .001–.0013 inch long; pedicel hyaline, short.

Living leaves of *Sophora sericea*, Pursh.

Mr. Brandegee remarks concerning this fungus that it is very common at Canon City, about one-half the Sophora plants being affected by it. The plants attacked by it become more erect in habit and do not blossom. The sori sometimes occur sparingly on the upper surface of the leaf also. The specific name is suggested by the hyaline membrane that at first covers them.

Puccinia nigrescens, *Pk.*—Spots none; sori rather prominent, cauline, oblong, blackish-brown or black; spores smooth, elliptical or oblong, obtuse or bluntly pointed, slightly constricted at the septum, .0015–.0018 inch long, .0008–.001 broad; pedicel colorless, two to four times as long as the spore.

Stems and branches of *Salvia lanceolata*, Willd.

No leaves of the host plant accompanied the specimens sent, so that I am not able to say whether the fungus ever attacks the leaves or not.

The two following species have been received from the sources given at the end of the descriptions:

Diatrypella Frostii. *Pk.*—Stroma verrucæform, rather prominent, convex or hemispherical, scarcely one line broad, sometimes confluent, partly covered by the closely adhering fragments of the ruptured epidermis, black externally, greenish within, forming a white spot on the wood beneath; perithecia sub-globose, generally ten to fifteen; ostiola obscure; asci sub-cylindrical, scarcely pedicellate, polysporous; spores yellowish in the mass, cylindrical, curved, .00025–.00035 inch long.

Dead maple branches. Brattleborough, Vermont. *C. C. Frost.*

Externally this fungus resembles small forms of *Diatrypella verruæformis*, from which it is easily separated by the greenish color of the stroma. *D. betulina*, which also has a greenish stroma, differs from this species in the larger size, different form and naked disk.

Sorosporium Desmodii, *Pk.*—Spore balls irregular or sub-globose, compact, rough, .0012–.0016 inch in diameter, color in the mass reddish-brown inclining to cinnamon; spores sub-globose, rough, .0006–.0007 inch in diameter, four to ten in a group, not easily separating from each other.

Seeds of *Desmodium acuminatum*, DC. Closter, New Jersey. *C. F. Austin.* September.

I am not aware that any representative of this genus has before been detected in the United States. Nor is it surprising that this species has so long escaped notice, for the fungus is wholly concealed, being produced in the seeds while they are yet inclosed in the pod. For a time there is no external evidence of the presence of the fungus, but at length a slight discoloration of the part of the pod immediately over the affected seeds indicates that all is not right within.

The whole seed, except perhaps the thin external coat, appears to be transformed into the fungus spores. The color of these is similar to that of the spores of *S. Saponariæ*, but the spore masses are smaller and less easily separated into their component spores. Every seed in a pod and nearly every pod on an affected plant, so far as shown by the specimens sent me, is attacked. From this it would appear that the fungus must be quite effective in preventing the increase of this Desmodium by the seed in localities where it abounds.

More about Lobelias.—In the April number (1877) of the Gazette I mentioned having found a white plant of *Lobelia syphilitica*. I now have to report not only a *red* flowered plant of the same species, (differing in no particular, except in color, from the common form,) but a remarkable plant which appears to be a hybrid between *L. syphi-*

litica and *L. cardinalis*. A careful comparison shows the following peculiarities: Leaves and calyx nearly as hairy as those of *L. syphilitica*; bracts intermediate; the flowers have the slender tube and the aspect of *L. cardinalis*, but broader at the mouth and with more conspicuous folds in the throat, nearly as large as in *L. syphilitica*. It has also the reflexed calyx sinuses of the latter species, but they are very short. The color is remarkable, and led to the discovery of the plant, being a deep reddish or crimson-purple; different from any plant I can now call to mind. It grew in the midst of a patch of *L. syphilitica* in low, moist woods; no plants of *L. cardinalis* nearer than two hundred yards, at which distance there were several There were but *two* plants of the hybrid.—J. Schneck, *Mt. Carmel, Ill.*

I have received and examined a specimen of this interesting plant, and I have no doubt that it is rightly considered to be a hybrid between *Lobelia syphilitica* and *L. cardinalis*. I never saw the like of it before.— Asa Gray.

Mistletoe Parasitic on Itself.—The Mistletoe (*Phoradendron flavescens*) abounds in Florida, where it may be found on nearly every kind of tree. We know of one plant of it growing on a low *Prunus Chicasa*, only eight feet from the ground; but it attains its greatest development on the lofty branches of old oaks, where a single plant frequently attains the size of a hogshead. Having a fine oak which had become overrun by this parasite to an extent which endangered the life of the tree, we recently had the mistletoe cut off. It would have required a hay-rack to carry it away at one load, for it equalled in amount the natural foliage of the tree. The fertile and sterile plants were about equal in number, size and color, but all were more *flavescent* than those growing on less burdened trees. We were not before aware that any plant ever grew on another of its own species, but here we found two instances of this phenomenon. In one case a staminate plant grew on a staminate, and in the other a pistillate on a staminate. In both cases the double parasitism was proved by the fact that the secondary plants sprung from internodes, and in the last the proof was rendered doubly strong by the dioecious character of the plant.

It would be interesting to know how the mistletoe compares in northern and southern latitudes as to germination and maturing of fruit. In Florida both are about simultaneous, but in the Northern States it would seem that an interval of several months must intervene. If so, there must be a much greater waste of seed, and probably the seed finds secure lodgment and germinates mainly on rough-barked trees. The distribution of the mistletoe must be effected mainly through the agency of birds, and yet it seems almost impossible that so soft a berry can pass through the digestive system without losing its vitality. At any rate the special adaptation of the fruit is for ready adhesion to external objects. Even to planed boards it adheres with almost the tenacity of glue. In this latitude the berries of the mistletoe are too green at Christmas to be of interest for decoration except from association. Towards the close of winter the pulp becomes thin and gelatinous, and the germ begins to grow and turn green within its nourishing and translucent envelope. In this condition the berries are readily beaten off by the spring rains and winds on to other branches, when the germs, already highly developed, quickly pierce through the bark to the nourishing streams of sap flowing beneath.

It would seem that the mistletoe, being green throughout, was specially adapted for the elaboration of sap, and that it ought to assist the tree in this office, if for no other reason than to maintain the health of the latter. Such services are sometimes performed by animal parasites, but common observation goes to show that vegetable parasites take only and give nothing. That this is true of the mistletoe is indicated by the fact that the portion of the branch beyond its insertion frequently dies, when the remaining portion ceases to grow. In such cases, the mistletoe will continue to grow until its diame-

ter exceeds that of the sustaining branch, which being overweighted, can no longer support the parasite except in a pendent position.—A. H. CURTISS, *Jacksonville, Florida.*

A CONVENIENT MICROSCOPE.—I have been so frequently consulted of late as to the best form of dissecting microscope for botanical purposes, that I am glad to be able to say our well-known Optician, Mr. Joseph Zentmeyer, of Philadelphia, has just constructed one that in all respects is what the analytical botanist requires. Mr. Zentmeyer needs no word of mine to commend his work. It is in the interest of botony that I write this.

The stand is round, of cast iron, and six inches in diameter. Hence the instrument is perfectly steady. The pillar supporting the stage is strong, of brass, and three inches high. Of just such a height that the hands holding the needles are free from tremor because the arms rest solidly on the table. The stage of brass is five inches long by nearly four wide, and *stationary*, thus contrasting most favorably with the old Raspail, and some of the later instruments. There is a glass plate nearly two inches in diameter in the middle of the stage, and abundant light is thrown on this from the mirror beneath. The arm carrying the lens is raised or lowered by a firm, and charmingly smooth working rach and pinion, which has a free lateral movement. A good lens magnifying about ten diameters completes this model instrument. Its advantages are: strength, neatness and a large steady stage, over all the cheaper instruments of this class, and it has all the good points of the finer dissecting microscopes at about half the cost. The glass plate in the stage may be removed and a watch glass put in, to contain any object we wish to examine in water, or an alcohol lamp placed under the stage will keep up the gentle heat we sometimes want in work.

The instrument as I have described it with a neat box, costs only fifteen dollars, and one dollar more would add an extra, higher-powered lens, thus making it equal to any work involved in analytical botany. Beside this, a tube might be added to screw into the arm carrying the lens, and thus at a very small additional expense the owner would have a compact, strong compound microscope that would do good field work with even a quarter or a fifth of an inch objective. For the botanical laboratories of Colleges it has no superior, when we consider economy and durability.—J. T. ROTHROCK.

MONOTROPA UNIFLORA.—Notwithstanding the pretty general distribution of this peculiar type of vegetation, its comparative numerical paucity in any region appears as rather a striking feature. In many hundreds of botanical walks we have found but one locality where this plant seems anyways abundant. This was in what is known as the "Beech and Oak Flats" of Jefferson county, Indiana. The timber is often quite dense, and the vegetable debris has often formed to quite a thickness by natural accumulation from year to year, and at the same time being aided by the presence of water except in the dryest seasons. Under such circumstances vegetable products of a fungus type are readily encouraged in growth. Here within the compass of a few square yards, and among the beech roots, we have secured as many as 50 fine specimens. However, in contemplating their beauty of form and delicacy of structure, we did not suspicion such a poisonous principle to lurk within as we have since found to be the case.

During the month of September a young lady brought me a plant which she said had poisoned her, and she desired its name. With some surprise, and perhaps I should have had none after considering its fostering food and close resemblance to the Fungi, I found the plant to be *Monotropa uniflora*. The circumstances of the case are as follows. The young lady while examining the plant accidentally crushed the stem, and some of the juice was driven upon her lips. The mucous portions which were somewhat chapped became very much irritated, and began to inflame and swell consider-

ably; while in two or three places upon the epidermal skin of the lip, small ulcerous sores were formed The effect remained some four or five days and then gradually healed. The whole appearance was very much like a mild case of poisoning with *Rhus toxicodendron*.—A. H. Y., *LaFayette, Ind.*

Coreopsis aristosa, Mich.—It will be interesting to botanists to have published in the Gazette observations on the seeds and awns of *Coreopsis aristosa* from numerous localities, to ascertain if the awnless or upwardly or downwardly barbed awns are inherent in the species, or if their anomalous development is incidental and attributable to the introduction of Bidens in the species. Here where the species largely abounds the awnless with upwardly and downwardly barbed awns are relatively about equal in all the localities I have examined the past season, where *Bidens frondosa* is numerously mixed in with the growth, and also where no species of the genus now abounds, would seem to indicate that the trait is an inherent one. And thus invalidating the most important character separating the two genera. If the species is found to be normally awnless, as is quite probable, and the awns due to Bidens, the upward and downward barbs would still be a puzzle, unless it should turn out to be that both forms of barbs are common also to Bidens, which is already almost established in the case of *Coreopsis discoidea*, which is sometimes a perfect *Bidens frondosa* in all except the upwardly barbed awns. The allied species *Coreopsis trichosperma*, should also be examined for similar anomalies whereit abounds. The species is absent from this section. Observations are needed in localities where Bidens is absent, and in all habitats the relative proportion of the three forms should be noted.—E. Hall.

Late Flowers.—I found the following list of plants still in flower on October 2d and 3d, in Exeter, R. I. It may possibly interest some western readers to see what are our late flowering eastern species. I have not classified the names, but have written them somewhat in the order in which the specimens were found. It will be noticed that some are early plants enjoying a second bloom:

Viola cucullata.
Gerardia purpurea.
" *quercifolia.*
Solidago linoides.
cæsia.
nemoralis.
elliptica.
odora.
Canadensis.
bicolor.
Aster corymbosus.
Novæ Angliæ.
lævis, var. *cyaneus.*
cordifolius.
longifolius.
Tradescanti.
multiflorus.
dumosus.
undulatus.
patens.
Gnaphalium polycephalum.
Antennaria margaritacea.
Hypericum Sarothra.
Œnothera biennis.
Lobelia cardinalis.
Trichostema dichotomum.
Brunella vulgaris.
Polygala cruciata.
" *sanguinea,*
" *verticillata.*
Linaria Canadensis.
vulgaris.
Pedicularis lanceolata.
(new to Rhode Island.)
Polygonum incarnatum.
" *dumetorum.*
" *articulatum.*
" *arifolium.*
Diplopappus linariifolius.
" *umbellatus.*
Spiranthes cernua.
Trifolium pratense.
arvense.
Potentilla argentea.
Nabalus Fraseri.
Hieracium Canadense.
" *venosum.*
Lepidium Virginicum.

Eupatorium pubescens.
" *perfoliatum.*
" *purpureum.*
Spiræa salicifolia.
Krigia Virginica.
Sisymbrium officinale.
Linum sulcatum.
Barbarea vulgaris.
Taraxacum Den-leonis.
Gentiana Andrewsii.

Out of bloom I noticed quantities of *Aletris farinosa*, *Hudsonia ericoides*, *Tephrosia Virginica*, *Ilex verticillata*, *Crataegus coccinea*, *Cephalanthus occidentalis*, *Ampelopsis quinquefolia*, *Cornus florida*, *Myrica cerifera*, &c., &c. This portion of our little State has not been explored, as evidenced by the fact that I found *Pedicularis lanceolata* in abundance by a road-side, although it is not recorded in our flora. In May and June the Cailopogons, Pogonias and Habenarias are superb in Exeter. I hope to do more careful work there.—W. W. Bailey.

Nomenclature.—I desire to protest against the prevailing abuse of personal nomenclature. Botanical names are for all time, and even if it is of interest to us to know that Jones discovered a certain plant, future generations won't care a fig whether Tom, Dick or Harry first stumbled upon it. Possibly it may stimulate research somewhat, and the botanist who abuses it most may get more new plants thereby, but the work can be done just as well without it. The "holy fires of science in the human breast" cannot be perceptibly dampened by the removal of so selfish a motive. If the collector feels that he must write his name in imperishable letters, let him get a mallet and chisel and hie him to the Pyramids, Give us a name expressive of some salient peculiarity or of locality or range, but don't, *don't* call it Smithia Brownii! If the abuse goes on much longer, I verily believe that, before the final hardening of Descriptive Botany, the great majority of personal names will be expunged.—D.

Botrychium lunaroides var. obliquum.—In February number, 1877, notice is taken of *Botrychium Virginianum* with forking spikes. My son, Master George C. Spence, found a *B. lunaroides* var. *obliquum* with *two* distinct and entirely disconnected fertile spikes. There was no sacrifice or stinting of parts to produce this extra fruitage, but on the contrary the effort was followed by an unusual development of beauty and vigor in the plant proper, as the main spike, starting from the usual point, reached the height of fourteen inches, with a fruitage of five and one-half inches inclusive. The extra spike grew on the petiole of the frond, two inches from base of the frond and one inch from main spike. This was nine inches high, with two inches of fruit as large and well developed as is usual in the ordinary plant. There was nothing whatever to indicate that injury to the plant was the cause of this very unusual development.—Mrs. E. J. Spence.

Variations.—Last spring I found a double flowering Claytonia; a *Uvularia grandiflora* with 8 petals, 8 stamens, 4 stigmas, and a 4-celled ovary; a tulip (in the garden) with 8 petals, 8 stamens and 8 stigmas; a tulip with 8 petals, 12 stamens, 3 of them united to the ovary, which was imperfectly 4-celled; another tulip with 7 petals, 7 stamens and 3 stigmas, and still another with 5 petals, 7 stamens and 3 stigmas; also a *Viola cucullata*, the blue flowers of which were beautifully striped with white. I have some of them in my garden.—A. Hubregtse.

Recent Publications.—*American Journal of Science and Arts*, February.—Sereno Watson gives a synopsis of the North American species of *Populus*, and has requested that notes on any species of Populus, with specimens, be sent to the Herbarium of Harvard University, Cambridge, Mass. It will be a benefit to science for all who have such notes or specimens to comply with this request, for by this means Mr. Watson will be able to place the species of this difficult genus upon surer foundation than ever before. "Specimens may be sent by mail fresh from the tree, without the trouble of

pressing or drying, by wrapping them in an ordinary newspaper." The species enumerated are seven, viz: *P. tremuloides*, Mx., *P. grandidentata*, Mx., *P. heterophylla*, L., *P. balsamifera*, L., with two varieties, *candicans*, Gr., and *Californica*, Watson, *P. angustifolia*, James, *P. trichocarpa*, T. & G., and the var. *cupulata*, Watson, *P. monilifera*, Ait., and *P. Fremonti*, Watson, with the var. (?) *Wislizeni*.

The American Naturalist, February and March.—In the latter number we have two botanical articles: "The Transpiration of Plants," by J. M. Anders, and "Rambles of a Botanist in New Mexico," by E. L. Greene. Both are interesting and deserve a fuller notice than our crowded pages permit us to give.

A Synopsis of the American Firs, by Dr. Geo. Engelmann.—Dr Engelmann takes up one difficult genus after another, and by the most patient and conscientious work brings order out of confusion. The species of *Abies* have long been confused, but now the sub-divisions of the genus are based upon leaf-structure, principally the two resin ducts, with greater certainty than on the length of the bracts, as was formerly done. "It is a most interesting as well as significant fact that while the anatomical structure of the leaves of higher organized plants shows considerable uniformity, so that it rarely can be made available for diagnostic purposes, the conifers exhibit such a wonderful variety of leaf structure (approaching thereby the lowest orders of vascular plants), that often a single leaf is sufficient to recognize the genus, and often the species, even when the ordinary characters may leave us in doubt." Nine species are enumerated, viz: *A. Fraseri*, Lindl., *A. balsamea*, Marshall, *A. subalpina*, Engelm., with var. *fallax*, *A. grandis*, Lindl., and var. *densifolia*, *A. concolor*, Lindl., *A. religiosa*, Schlecht., *A. bracteata*, Nutt., *A. nobilis*, Lindl., and *A. magnifica*, Murray.

Ferns of North America, by Prof. D. C. Eaton, Parts II and III.—The second and third parts of this splendid work are fully equal, if not superior in fine workmanship to the first, and Mr. S. E. Casino is to be congratulated upon its fine typographical appearance. In Part II there are three plates, containing seven species, and descriptions of six. The species are *Asplenium ebeneum*, Ait., *A ebenoides*, R. R. Scott, *Botrychium lunaria*, Swartz, *B. lanceolatum*, Angstrom, *B. boreale*, Milde, *Cheilanthes lanuginosa*, Nutt., and *C. Californica*, Mett. The specimens of *Asplenium ebeneum* found in considerable abundance in this county are much more luxuriant in habit than the one figured, but not more so than is provided for in the text. The figure of *A. ebenoides* shows well its supposed hybrid character, the long, tapering, proliferous tip much resembling *Camptosorus rhizophyllus*, and its other features like *A. ebeneum*. Prof. Eaton recommends the attempt to produce this plant by artificial hybridizing, and thus establish its true hybrid character or not. *Botrychium boreale* is figured and described although collected but once in North America and that by Chamisso, sixty years ago in Unalaska. Its appearance in this work, however, may aid in its re-discovery. In Part III five species are figured, viz: *Aspidium Noveboracense*, Swartz, *Camptosorus rhizophyllus*, Link, *Asplenium pinnatifidum*, Nutt., *Notholæna Fendleri*, Kunze, and *N. dealbata*, Kunze.

Catalogue of the Phænogamous and Vascular Cryptogamous Plants found growing wild in Jefferson county, Ind. This catalogue is compiled by Mr. Chas. R. Barnes, and Mr. Jno. F. Baird adds a short list of plants growing in Clark county, not as yet found in Jefferson. The Jefferson county catalogue numbers 912 species through the Vascular cryptogamia, and hence forms a valuable check list. Any one desiring copies of it can be supplied by writing to Mr Chas. R. Barnes, Madison, Ind.

COLUMBIA COLLEGE HERBARIUM NEW YORK

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THE TWO WAYSIDE PLANTAINS, BY ASA GRAY.—I wish to call the attention of Botanists to the Common Plantains of the country, and to make a public, though tardy expression of thanks to Mr. A. Commons, of Centreville, Delaware. I send you, here with, for insertion, his letter to me, which the date shows to have been long unattended to. I have in some way or other postponed its consideration until now, when the review of the genus for the part of my Synoptical Flora of North America, now in press, brought the subject directly before me:

CENTREVILLE, DEL., Dec. 20th, 1876.

PROF. A GRAY: *Dear Sir:*—

I have a few specimens I wish to submit and request you would examine and name for me. Two of them are deviations from the usual form; another, a *Plantago*, is probably a good species. However, the specimens will prove whether it be entitled to that distinction. To me it seems sufficiently marked in its characters to deserve being considered as such. I will send a package in a few days made up most largely of the two forms (as I will call them at present for convenience) of *Plantago*; the *Plantago major*, L., or smaller form, and another, a larger one, which resembles it in appearance but distinct in character. This larger form is the most abundant and common one of the two growing here. The smaller one, *P. major*, L., being the rarer and less common one, and does not seem to propagate or extend itself so rapidly. A brief comparison of the two is given in a separate paper which is enclosed. In 1864, when I first observed the two forms, I had got the impression that the larger one was the *P. major*, L., but have since ascertained this to be erroneous. Others here, I am constrained to believe, may have previously entertained the same view. I infer this, however, because the larger form is here so generally common, while the other is not. Therefore, they are most likely to be obtained by them in making their collections, but it does seem strange that these two forms should be here growing together and have remained so long unnoticed by any of our Botanists.

The two Plantagos briefly compared:

Plantago ——— Larger, acute form.		*Plantago major*, L., Smaller, obtuse form.
Larger, smooth or hairy, generally smooth, light green, thinner in texture.	Leaves.	Smaller, smooth or hairy, generally hairy, deeper green, somewhat thicker in texture.
Longer, tapering to a point.	Spikes.	Shorter, termination blunt or abrupt.
Longer and larger, more erect and upright on the spikes, opening below the middle or $\frac{1}{3}$ way from base and below the top of the calyx.	Pods.	Smaller, more closely aggregated and standing out more squarely on the spikes, opening at the middle and opposite the top of the calyx.
Larger, black, more acutely angled, not wrinkled.	Seeds.	Smaller, light brown, obtusely angled, wrinkled.
Very common and abundant here.		Rarer and less common.

Certainly a distinct species as the characters indicate.—A. COMMONS.

I have little to add except that the ovules in his specimens vary from 6 to 10, more commonly 10; in *P. major* from 8 to 18; also that the capsule in the former is narrower as well as longer than that of *P. major*, being cylindraceous-oblong, and a little over 2 lines in length; the seeds in the former are of twice the size of the latter, dull as well as dark and without the delicate reticulation of the coat which fresh and dry seeds of *P. major* exhibit. Finally, the sepals of the long-podded species are oblong, decidedly narrower than those of *P. major*, and all four, as well as the bract, more strongly and acutely keeled.

On looking at the older descriptions, I observe that the Plantain in question has been taken for *P. major*, probably by Elliott, certainly by Torrey, in his Flora of the Northern States, and by Darlington in the second (and most valuable) edition of the Flora Cestrica. The terms which they use in describing the calyx and the capsule may assure us of this. Mr. Commons remarks that it is much the more common species in his neighborhood. If my memory rightly serves, it is the door-yard Plantain of my natal district, the central part of the State of New York. I have it from Vermont and Canada (so that it may be the plant which Pursh mistook for *P. cucullata*, which is *P. maxima*, Jacq.); and I have small and slender forms of it from South Carolina, Georgia, and Texas, also from Southern Illinois. In short, it is the plant which first Hooker and afterwards I myself mistook for *P. Kamtschatica*. Although there are only four seeds in the pods of the slender specimens which I had formerly examined, there are commonly 6 or 8 ovules, *i. e.* three or four in each cell. I am sorry to say that the only published name applicable to the species is that of *P. Rugelii* of Decaisne, founded on a depauperate form of it. I should have preferred to have it bear the name of some one of those botanists who have evidently had it in hand, without knowing it was an undescribed species, probably indigenous to the country; for I find no trace of it in any other part of the world, not even in our north-western regions from which we have a probably indigenous form of *P. major*, or of the nearly related *P. Asiatica*, of which the real *P. Kamtschatica* appears to be a few-seed form.

Foreign Plants Introduced into the Gulf States.—With a few exceptions of those foreign plants which have found their way into this region from the Atlantic coast, or from the country adjoining south of it, their introduction has been effected through the seaports, and, as elsewhere, chiefly by the deposition of ballast from the shipping. In his exploration of the flora of this coast region, the botanist is surprised at finding, almost season after season, plants strange and new to him, arrivals from distant shores in different zones of the new and the old world. As will be seen from the following list, some are mere transient visitors, losing soon their foothold and disappearing entirely, like the West Indian *Melochia melissæfolia*; some reappearing again, after a lapse of years, as the *Mercurialis annua;* while others, adapting themselves more readily to the conditions to which they are exposed in their new home, continue to flourish and to propagate their kind year after year. Some species amongst them spread rapidly into the interior, becoming fully established amongst the denizens of the indigenous flora, and in extending over large areas of ground, covering it to a greater or less exclusion of the native races, add new features to it and affect decidedly for better or worse the economies of man. One of the most striking instances of the kind is offered by the introduction and rapid spread in the Southern States, during the last ten years, of the *Lespedeza striata*, whose history seems to be of sufficient interest to put upon record. Dr. Ravenel mentions first this plant from the *far East*, as having been observed by him about twenty years ago near Charleston, S. C. Immediately after the war the rapid spread of a new plant arrested the attention of the farmers in that State and Eastern Georgia (Dr. Mettaur, 1865.).* The year after, the agricultural

*Chapman, Bot. Gazette, Vol. III, No. 1, p. 4.

press of the South devoted a good deal of attention to it, in most instances heralding the appearance of the plant, popularly called *Japanese Clover*, as a blessing, destined to convert the barren pine hill and the waste, exhausted fields into rich pasture grounds, and in that way supplying one of the greatest wants in the system of Southern agriculture. By the kind information received lately of Mr. A. Berksman, of Augusta, Ga., I learn that the plant made its appearance in the spring of 1867. The following season (April, 1868) I found it in abundance in the counties of Montgomery and Lowndes in this State (Alabama) wherever a closer and somewhat damper soil afforded to it its proper habitat, gaining a firm hold even among the thickly matted stolons of the Bermuda grass (*Cynodon Dactylon*) covering the rich lowlands. I looked in vain for it during that season in this vicinity. In September, 1869, a friend interested in the matter brought me the first specimens observed in the eastern suburbs of this city. In the following season it was found very common everywhere in the situations most suitable to its growth, continuing with rapidity its progress towards the west, undoubtedly reaching the eastern banks of the Mississippi soon after its arrival here. I have not learned whether the plant has crossed that mighty river. East of it, it covers immense areas, in many places crowding out almost completely the herbaceous indigenous plants, for which the collector now searches in vain in the former habitats taken possession of by the Asiatic intruder. As far as my personal knowledge goes the *Lespedeza striata* extends nearly to the northern confines of this State. I found it in 1873 abundantly in the northern parts of Blount County. It is to be presumed that it occupies the same latitude in the adjoining States. One of the principal causes by which the rapid spread of that plant has been effected, is certainly due to the transfer of the herds of beef cattle following through the South the movements of the armies during the war, and since that time to the increased traffic in live stock between the different sections of the South. Watching its spread closely at its first appearance here, I found almost invariably the plants starting from the decayed droppings of cattle. The hard seeds of the plant are voided with the excrements without injury to their vitality, and finding a medium rich in the elements for their sustenance the young plants developing from it grow with the greatest vigor.

Comparing the introduced plants observed here with those noticed by Mr. I. Martindale on the ballast grounds near Philadelphia, we meet the fact that there are certain species, more than others, bearing the habits of cosmopolitan wanderers. Belonging to different natural orders and coming from zones of our globe separated by wide distances and of different climes, they are noted as arrivals common to both of those places on our coast, where they find themselves surrounded by the vast differences in climatic conditions due to the great one in their gegoraphical position. These plants seem to be endowed with a particular aptitude to accommodate themselves to their new environments in which they have been accidentally placed and where they are exposed to extremely different influences. To illustrate this fact I will mention that amongst a few of my ballast plants which I sent to Mr. Martindale for determination he found the strange *Polanisia viscosa* and the stately *Nicotiana glauca*, both oriental plants collected by me on the ballast grounds at Pensacola, also growing on similar places upon the banks of the Delaware, as well as the *Tournefortia heliotropoides* from the La Plata States, found seemingly firmly established near Montgomery, Ala., (April, 1868). *Diplotaxis tenuifolia* and *Heliotropium Europæum* of Southern Europe are found as firmly established there as in Pensacola or New Orleans; and similar instances can be found in comparing these notes with the interesting list published by Mr. Martindale in Nos. 1 and 10, Vol. 2, of the BOTANICAL GAZETTE.

The following plants from distant shores of the new and from the old world have been observed by me in this region and specimens of them preserved in my herbarium, if not otherwise stated:

Ranunculus muricatus, L., and *R. parviflorus*, L., have been recognized by our earliest botanists as fully naturalized. The first is confined to the coast; the latter extends into the interior.—Montgomery, 1868.

Ranunculus sceleratus, L.—Observed around the wharves of this city for the last few years.—April, 1873 and 1876.

Fumaria officinalis, L.—Ballast ground, Pinto Island, Delta of Mobile river; one specimen only.—April, 1877.

Sisymbrium Thaliana, Gaudich.—Sandy banks of Pascagoula river, Miss.—April. (Europe.)

Diplotaxis tenuifolia, L.—From the Mediterranean region of Europe.—Ballast grounds, Pensacola, Fla. Many specimens in bloom and full of seed.—July, 1874 and 1875.

Alyssum maritimum, L.—From Southern Europe. Galveston, Texas. Dr. Joor.—1875.

Capsella Bursa-Pastoris.—Pinto Island, Mobile river.—April, 1877.

Polanisia viscosa, L.—Flowers yellow. Pensacola, Fla., ballast ground. From Ceylon and Malabar. Only a few specimens.—July, 1875.

Gynandropsis pentaphylla, DC.—Common in waste places upon the banks of the Mississippi, La.—(New Orleans, Riddell). Mexico.

Spergula arvensis, L.—Covering low cultivated grounds near the coast. Europe.

Melochia melissæfolia, L.—For the first time noticed in October, 1875, in the new made ground of a railroad bed near this city. There were many specimens covering the ground extending several square rods; blooming freely and with an abundance of well ripened seeds Not a plant of it was to be found last summer. The unusually cold weather of the previous winter must have destroyed the plant completely.—A native of the West Indies.

Tribulus cistoides, L.—A beautiful plant with long spreading decumbent stems loaded with golden-yellow flowers open during the hours of mid-day. Seeding abundantly; fully established on the ballast grounds of Pensacola, Fla. July, 1873 and 1875. —Native of Tropical America.

Kallstræmia maxima, T. & G.—Near the wharves, Pensacola, Florida, not scarce. July, 1875.

Erodium cicutarium, L.—Banks of Mississippi river, Louisiana, (Feliciana, Dr. Carpenter. Riddell, New Orleans.).

Medicago minima, L.—Covering large patches on Pinto Island during the spring; it dries up completely in the summer months, the small prickly legumes covering thickly the ground. Fully established.—From Southern Europe

Medicago denticulata, L.—New Orleans. Riddell From Southern Europe.

Medicago maculata, L.—Banks of Mississippi in Louisiana. Carpenter, 1839.

Melilotus parviflorus, Desfont.—Abundant on Pinto Island. April.—From Southern Europe, 1873.

Lespedeza striata.—Since 1869; now everywhere common.

Vicia sativa, L.—Old fields, road-sides; fully naturalized.

Vauquelia Farnesiana.—A common shrub near New Orleans (Dr. Riddell) and Pensacola, Fla. July, 1875, ripe seeds; flowers in December.

Indigofera Anil.—Escaped from cultivation attempted by the earliest settlers, but abandoned many years since. Road-sides and fence-rows near dwellings. 1870.

Fragaria Indica, L.—Very common on damp roadsides, shaded ditches and hedges. Flowering and fruiting during nearly the whole year.

Rosa laevigata, Mich., and *Rosa bracteata*, L.—Both from Eastern Asia, noted as fully naturalized by the earliest botanists. The former is a common hedge plant in South Alabama; the latter is more frequently met with west of the Mississippi river.

Helioscyadium leptophyllum, DC.—This annual is common in cultivated grounds and waste places in the coast region of the Gulf States.

Richardsonia scabra, L. Her.—Very common near the coast in this State, having taken possession of old fields and cultivated grounds. Said to have made its appearance at the time of the Mexican war. Twenty years ago when I met the plant here first it was certainly not near as frequent and extended as now. It is not found at a distance of 50 or 60 miles from the seaboard.—From the warmer parts of the American continent.

Acanthospermum xanthoides, DC.—According to Mr. A. Berksman in Augusta, Ga., it has made its appearance there and is rapidly spreading.—From South America.

Parthenium hysterostrophus, L.—Waste places. Common in the streets of Mobile and New Orleans.—West Indies and South America.

Cnicus benedictus, L.—Abundant in open pasture grounds. Montgomery, Ala. Completely naturalized. Flowers April, (1868).

Anagallis arvensis, L.—On ballast ground in several localities, not frequent, the variety with red flowers. Mobile Co.

Centunculus minimus, L.—Sandy fields near the coast. Mobile Co.

Lycopus Europæus, L., and *Lamium amplexicaule*.—Common Mobile Co.

Leonotis nepetæfolia, R. Br.—One specimen in seed in the fall of 1873. Mobile, and not found since. Harrisburg, Texas, Dr. Joor, 1875.

Verbena venosa, Gill and Hook.—Not unfrequent in several localities near this city, on roadsides and cultivated grounds. First noticed in 1865. From Buenos Ayres.—This hardy perennial has also been sent to me by Dr. Joor from Louisiana, and is here completely naturalized but slowly spreading.

Heliotropium Europæum, L.—Large specimens from New Orleans. Dr. Riddell.

Tournefortia heliotropoides, Hook.—This perennial I found in waste places, near Montgomery, Ala., in April, 1868. Quite abundant. From Buenos Ayres.

Nicotiana glauca.—Ballast grounds, Pensacola, Fla., April, 1875–76. Fine specimens sent to me in two successive seasons.—Asiatic.

Hyoscyamus albus, L.—Several large plants amongst the rocks of the ballast ground in Pensacola, Fla., July, 1874. Ripening seeds abundantly and to perfection. Southern Europe.

Ricina humilis, L.—Waste grounds near New Orleans, Dr. Riddell. Banks of Red river near Alexandria, La., Dr. Jos. Hale; numerous large specimens.

Sphenoclea Zeylanica, Gaertn.—Waste places banks of Red river, Alexandria, La., Dr. Jos. Hale, 1839. (Like the last from the Riddellian herb.) Common in the tropics of the old world.

Chenopodium vulvaria, L., (*Chen. fœtidum*, Lam.).—Abundant on the ballast ground, Pensacola. Of a more robust habit than I know the plant from the Mediterranean region of Europe to be. Stems 10–12 inches long. July, 1875.

Salsola Kali, L.—Frequent on the sandy sea beach. Mobile. (From Europe).

Euphorbia Peplis, L.—Ballast grounds Pinto Island, frequent and fully established. (Europe).

Mercurialis annua, L., makes its apearance in some years in abundance near the wharves of the city, in others completely missing. Mobile 1858 and 1866.

Stillingia sebifera.—This Chinese tree is to be considered as fairly naturalized in lower Louisiana.

Aira caryophyllea, L.—Borders of woods and roadsides. For the first time observed near Spring hill, Mobile Co., April, 1877. Numerous specimens. Europe.

Sporobolus Indicus, Brown, *Eleusine Indica*, L., and *Dactyloctenium Ægyptiacum*, Willd., are common grasses around dwellings and in cultivated grounds throughout this region. All eastern plants.

Arenatherum avenaceum, Beauv.—Pinto Island, Mobile river, scarce, 1877.

Avena fatua, L.—A few plants with the above, 1877.

Manisurus granularis, Swtz.—In rich cultivated ground near New Orleans, Louisiana. Riddell.

Sorghum Haleppense.—Escaped from cultivation and fully established in lower Louisiana. Riddell.

The following plants indigenous to Texas and the territories southwest of it have been observed in the eastern Gulf States, and to my knowledge have so far not been recorded. Those occurring in the coast region either on ballast grounds or confined near human dwellings must be regarded as introduced plants; others, however, might be counted as species belonging to the flora of the States east of the Mississippi, having reached here their northern limits:

Trepocarpus Æthusa, Nutt.—Of these rare Texan plants I found a patch covered with numerous specimens in bloom and with ripe seeds on Pinto Island, Mobile river, July, 1874. The year after in search of a supply of specimens, not a single plant was found, nor has it reappeared since. Also, from Cheefuncte light-house, La. Dr. Riddell, 1839.

Leptocaulis echinatus, Nutt.—Roadsides and cultivated grounds, frequent in the new Green Bay settlements, Mobile Co. April, 1873, first observed; spreading there since with every season. (Arkansas and Texas.)

Gaillardia pulchella, Torrey.—Covering year after year a large part of the ground at Pinto Island. June and September.

Coreopsis Drummondii, T. and G.—This fine Texan annual adorns the lawns, roadsides and open copses on the eastern shore of Mobile Bay, (1859,) also frequent at Pascagrule, Miss., April, 1873. If introduced it is completely naturalized.

Eragrostis vaglepis, Torr.—Quite a colony of it was found at Cedar Point undoubtedly introduced there with ballast. A very beautiful grass.

Pteris cretica, L.—Found on shaded moist banks in woods near Mobile. This fern so frequent in the tropics of the globe is perhaps indigenous here.

Pellea flexuosa.—Of this fern frequent in Mexico, I found fragmentary specimens collected by Dr. Riddell in Western Texas, 1839.

Lycopodium cernuum, L.—New to the flora of the United States, for the first time found on springy claybanks of the bluffs fronting the eastern shore of Mobile Bay, July 4th, 1877. Common throughout all tropical America.—Charles Mohr, *Mobile, Alabama.*

"Die Pilze des Weinstockes," Wien, 1878.—This is a volume of two hundred and fourteen pages, from the pen of the excellent Mycologist, Felix von Thumen, the well-known author of "Mycotheca Universalis." In this work on the *Fungi of Grapevines*, the author gives descriptions (in Latin) of about two hundred and twenty species that have been found inhabiting either the living or dead vines, fruit, etc., together with references and synonyms. This is followed in each case by an amplified description and remarks in German. Thirty species are described as new. The work is divided into four sections, thus:

I. Fungi inhabiting the fruit, 18 species.
II. Fungi inhabiting the stems and branches, 164 species.
   A. Inhabiting living stems and branches, 11 species.
   B. Inhabiting dead stems and branches, 153 species.
III. Fungi inhabiting the leaves, 36 species.
   A. Inhabiting living leaves, 20 species.
   B. Inhabiting dead leaves, 16 species.
IV. Fungi growing from the roots, 5 species

Five lithographic plates are added, giving illustrations of ninety-seven species of these fungi. There are also two lists of species: one in which they are arranged under their respective orders or families, the other in which they are grouped according to their nourishing plants. From the latter list it appears that much the largest number of species has been found on the European grape-vine, *Vitis vinifera*, L., whose parasites number one hundred and fifty species. *Vitis Labrusca*, L., stands next, nourishing fifty-four species. Many of these fungi are American.

We consider this work a most valuable addition to mycological literature and an important aid to the student of fungi. It is also a work that commends itself to those interested in grape culture.—CHAS. H. PECK.

NATURAL RADICAL GRAFTING.—Much more wonderful than the "*Natural Grafting*" recorded by the respective editors of the GAZETTE and *Bulletin*, in the September and December numbers, 1877, is the case of Gamo-radical Grafting accidentally produced here in Ames, by Mrs. Dea. Kingsbury, potting two plants of the "Deer's Tongue" and "Rat's tail" Cactus, resulting in a profuse crop of the latter issuing from the extremity of the leaves of the former! There is no mistake about this, the writer having examined the plants, and secured a specimen, and any one can try the experiment for himself. *It did not result from the effect of pollen, as neither plant was in bloom*, nor indeed has ever bloomed!—R. BURGESS, *Ames, Iowa.*

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, March.—Dr. Gray gives a Supplementary Note to the Review of Darwin's "Forms of Flowers," being an answer to some statements made by Mr. Meehan in the Torrey Bulletin in respect to cross fertilization. The Botanical Necrology for 1877 is also given and contains an unusual number of noted names. Ten names are reported.

The American Naturalist, April.—Rev. E. L. Greene continues his "Rambles of a Botanist in New Mexico," confining himself in this second paper principally to the sylva. Mr. C. G. Pringle has an interesting note on "Cleistogamous Flowers in Danthonia."

Bulletin of the Torrey Botanical Club, February.—Mr. J. H. Hall gives a very interesting account of *Opuntia Ficus-Indica*, DC., of Southern Italy and other Mediterranean countries. Its main use in the Orient is to furnish a hedge, and next to furnish food. Dr. Gray advises some younger botanists to make haste more slowly, making this the basis of some remarks upon Mr. Wolle's papers on Fresh Water Algæ. Jos. Schrenk writes of "The Excentricity of the pith in *Rhus Toxicodendron*." His observation goes to prove that this excentricity is caused by the absorption of water by the lateral rootlets. This more abundant supply of water produces greater activity in the cambium cells, their turgescence would be more intense and the ducts larger than on the opposite side.

Field and Forest, Jan. and Feb.—The Botanical part of this double number is unusually full. Mr. Thomas Morong writes of the Flora of Martha's Vineyard and Vicinity, and also in the "Field Record" notes two forms of *Plantago major* that had been pointed out by Mr. A. Commons, of Centerville, Delaware. An article by Dr. Gray upon the same subject, in the present number of the GAZETTE will be read with interest.

The Valley Naturalist, March and April.—This enterprising sheet appears promptly with every month and bids fair to become a useful medium for scientific notes.

On the Transpiration of Plants, by J. M. Anders, M. D., Ph. D.—A very interesting series of observations is recorded in this paper, showing that, under favorable circumstances, the amount of watery vapor transpired by plants is something wonderful. According to the rate deduced from his experiments the Washington Elm, at Cambridge, not a very large sized tree, would transpire 7¾ tons of watery vapor in twelve hours

(day) of clear weather. Carrying this calculation further we are impressed with the important part that groves and forests play in preserving the humidity of the air.

Notes on Trees and Tree-Planting, by C. S. Sargent.—This paper is considered as supplementary to one contributed by the author to the Report of the Board of Agriculture for the year 1875. In the latter he considered the value of the white ash, white and Scotch pines, European elm, white oak, the hickories, white willow, sugar-maple, and European larch, for New England plantations. The present paper adds to the list the red or Norway pine, the wild black cherry, the American cork, or Western rock elm, and the Ailanthus. The last mentioned tree, the writer thinks, has been at once the subject of more undeserved praise and more ignorant and foolish abuse than any other tree. The paper is well worth a careful perusal.

Botanical Directory for America, 1878.—Mr. W. H. Leggett has done a very great favor to Botany in publishing this very full directory. It contains the names of nearly 1,000 American botanists and is invaluable to botanists desiring information or exchanges, to say nothing of those of us who publish for the botanical Fraternity. The third part, relating to libraries, herbaria, gardens and catalogues of value, will probably be ready about the beginning of May. The price is 40 cents for one copy; three copies for $1.00; twelve copies for $3.00. Address Wm. H. Leggett, 54 East 81st street, New York City.

Transactions of the Massachusetts Horticultural Society, 1877, Parts I and II.—Besides reports of committees and prizes offered and received, we find some very interesting botanical information. "Fertilization and cross-fertilization" and "Injurious and other Fungi," are given in the form of lectures and then discussed.

Sur l'existence de Races Physiologiques dans les Especes Vegetales a l'etat spontane, par M. Alph. DeCandolle, January, 1878.—M. DeCandolle has published before some observations on the same subject. MM. Naudin and Radlkofer experimenting at Collioure and Munich have reached results confirmatory of those published by M. DeCandolle. In the present paper the author brings together the two sets of experiments, and after having shown the results, adds some remarks upon the physiological differences in vegetables of the same form, and the condition of the science in respect to the questions of the origin of these differences. The modification of species under the influence of climate is a very important question, and the author considers the observations too few as yet to be able to hazard many deductions. The method of experiment was as follows: Seeds of the same species were obtained from as widely separated localities as possible, and subjected to the same treatment. The times of their blooming, and their various sizes were noted and compared. The results show quite a diversity both in the time of blooming and in the size and vigor of the plants. The plants experimented with by M. DeCandolle were a dozen in number, but only two gave satisfactory results for comparison, *Senecio vulgaris* and *Trifolium repens*. Of the plants experimented with by MM. Naudin and Radlkofer, several were ruled out as being unsatisfactory, leaving only two that could be properly used, *Calendula arvensis* and *Sonchus oleraceus*. The two following conclusions are deduced from the experiments: I. That some seeds of the same species coming from distant countries, sowed together, exposed to the same influences, do not produce individuals that grow in absolutely the same manner. II. That in certain species, notwithstanding a similarity of external forms, the difference from the vegetation of the originals is better characterized than in others.

Rapport sur le jardin experimental de M. Jordan, par Alph. DC., February, 1878.

COLUMBIA COLLEGE HERBARIUM, NEW YORK.

BOTANICAL GAZETTE.

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VITALITY OF THE SEEDS OF DATURA TATULA, L.—In answer to the call for facts bearing on the vitality of seeds, I venture to contribute what follows:

From the spring of 1855 to the autumn of 1866 I occupied a house on Duke street, in the heart of the city of Lancaster, Penn. To this house was attached a garden, which extended to an alley in the rear and was separated from it and the neighboring gardens by high, close board fences. Its cultivation had been neglected, and, on taking possession, I observed in the lower end of it a huge stalk of *Datura Tatula*, L., which had been allowed to grow and spread itself and ripen and shed a large crop of seeds. That summer, after the ground was dug and planted, a numerous host of young Jimpsons came up. These were extirpated. The next season another set appeared, and were dealt with in like manner, and so on, up to *the 10th year*, the numbers diminishing each year. I am sure they all sprang from seed of the same sowing. The second year I began to feel curious about their persistence, and then and during the years that succeeded carefully searched the alley far and near and all the gardens and vacant lots in the neighborhood and discovered no parent from which they could have come. It was barely possible for the seeds to have been introduced in manure, but then the occurrence of the plants only around the spot *where the old stalk stood*, and their gradual diminution in numbers forbade the supposition. *In all parts* of the garden seedlings of the honey-locust and ailanthus would at times show themselves. These were readily traced to cultivated trees at some distance. The strap-like pods of the former and the winged fruits of the latter are scattered widely by the winds, but the seeds of *Datura* require other means of transport.—THOS. C. PORTER, *Easton, Penn.*

FROM THE INDIAN TERRITORY we have received a collection of Plants numbering several hundred, made during the years 1875–7, by Timothy E. Wilcox, M. D., Ast. Surg. U. S. A. Below is a list of all the species among them *not* growing east of the Mississippi River, and consequently not described in Wood's Class Book, nor in the Botanist and Florist. It will be noted with surprise that only *one species* had been seen by Linnaeus:

Delphinium occidentale (*D. elatum*, var. *occidentale*, Watson.) Hoary pubescent above. Flowers bluish-white, the spur long, ascending, downy-canescent, the lower (apparently upper) petals bearded with cotton and their long claws spurred at the base.

Streptanthus hyacinthoides, Hook. Flowers large, deep bluish-purple. An attractive plant.

Biscutella Wislizeni, Eng. Found also in Texas and Southern California. Fruit large, 2-orbed. Flowers white.

Lepidium integrifolium, Nutt.
Vesicaria Ludoviciana, DC.
Paronychia Jamesii, T. & G.
Talinum parviflorum, Nutt.
Malvastrum coccineum, (Nutt.) Gray.
Krameria lanceolata, Torr.

Rhus trilobata, Nutt. Regarded by some as a variety of *R. aromatica*, Ait.

Dalea aurea, Torr. Large oblong spikes with golden yellow corollas set in the white plumage of the calyxes.

Petalostemon villosum, Nutt.

Astragalus mollissimus, Torr. Called "Pony Weed." It is an object of dread in the Territory, being considered *fatal* to the horses that feed upon it. The plant is densely silky-canescent all over, erect near 1 foot. Leaflets about 12 pairs, oval. Spikes

on a long peduncle, oblong, dense. Flowers nearly 1 inch long, blue-purple. Pod 2-celled, curved, grooved at each suture.

A. bisulcatus, Gray.

A. Nuttallianus, DC.

A. glareosus, Dougl.

A. RECTICARPUS, (*n. sp.*) Under the section HOMALOBI. Cinereous with minute appressed hairs. Stems assurgent or erect 1 foot, slender, simple. Leaves subsessile, leaflets 7–9, mostly alternate, oblong-spatulate, apiculate, edges revolute. Peduncle longer than the leaves, spicate, 5–20-flowered. Stipules subulate. Calyx segments subulate-filiform, *thrice longer than the tube*. Corolla 4 lines long, purplish, vex. as long as the keel. Pod straight, sessile, deflexed, linear-prismatic, 1-celled, $1\frac{1}{4}$ inch long, 8–10-seeded.

Oxytropis Lamberti, Pursh.
P. cuspidata, Pursh.
Psoralea digitata, Nutt.
P. hypogaea, Nutt
P. linearifolia, T. & G.

Hoffmanseggia Jamesii, Torr. Plant beset all over with black dots, and groaning under the burden of its names.

Glycyrrhiza lepidota, Nutt.
E. Hartwegii, Benth.
Mimosa fragrans, Gray.
E. caespitosa, Nutt.
Acacia hirta, Nutt.
Stenosiphon virgatus, Spach.
Œnothera pinnatifida, Nutt
Mentzelia nuda, T. & G.
Œ. Missouriensis, Sims.
Apium (Leptocaulis) patens, (Nutt.) Wood.

Townsendia Wilcoxiana, Wood. (Bulletin Torr. Bot. Club, Vol. 6, p. 163.) Differs from *T. sericea*, Hook., in having the pappus of the ray and the disk equally long and copious, also the teeth of the tubular florets colored brown.

Chrysopsis villosa, Nutt.
Senecio Riddellii, T. & G.
Zinnia grandiflora, Nutt.
Actinella acaulis, Nutt.
Riddellia tagetina, Nutt.
Grindelia squarrosa, Dunal.

G. NUDA, (*n. sp.*). Glabrous, corymbously branched. Leaves sessile, oval, ovate or oblong, the upper lanceolate, all evenly glandular serrate. Heads discoid, involucre squarrous, pappus of 4 (rarely 3 or 5) stiff white bristles as long as the floret.

Helenium tenuifolium, Nutt.—but the lower leaves are often pinnately divided.
Gaillardia lanceolata, Michx.
Collomia longiflora, Gray.
G. pulchella, Foug.
Gilia pinnatifida, Nutt.
Flaveria linearis, Lagasca.
Convolvulus lobatus, Eng. & Gr.
Artemisia filifolia, Torr.
Ipomaea leptophylla, Torr.
Hymenopappus tenuifolius, Pursh.
Physalis lobatus, Torr.
H. lutens, Nutt.
Withania Coronopus, Torr.
Dichaetophora campestris, Gray.
Eustoma Russelianum Nutt.
Taraxacum palustris, DC.
Acerates decumbens, Den.
Mimulus lutens, Linn.
Obione argentea, Moq.
Salvia Pitcheri, Torr.
Croton Texensis, Muller.
Heliotropium convolvulaceum, Gray.
Carex marcida, Boott.
Eritrichium Jamesii, Torr.
Spiranthes Romanzoviana, Cham.

Poa Michauxii, Kunth. A remarkable grass. The spikelets when mature are cream-white, about 12-flowered, near 1 inch long, all in a short dense panicle.

Elymus Canadensis, var. *minimus*, (Wood.) Plants 2–4 inches high, the spike 5–10 lines long, concealed more or less in the sheath of the upper leaf Spikelets and flowers small in proportion.

Buchloe dactyloides, Eng. A diœcious grass, remarkable for the dissimilarity of the sterile and fertile plants.—A. WOOD.

Polygamous Flowers in Populus.—On the 7th of April I found a few pistillate aments of *Populus tremuloides* with both kinds of flowers, and on fast-day (the 11th inst.,) I found four small sized female trees that were more or less polygamous.

On one of these trees nearly every ament that I examined had perfect flowers in addition to the regular pistillate ones. In one instance the stigma was partially covered with pollen from the open anther which was apparently just in the act of discharging its pollen.

The number of stamens in these flowers varied from one to four. Usually two, or three, but sometimes four stamens were arranged around the pistil, the disk being enlarged for their accommodation.

I do not remember to have seen anything of this kind mentioned before in connection with this genus, but Prof. Goodale tells me that Mr. Bailey has noticed it in *Populus balsamifera*, near Providence, R. I., and Mr. Watson, to whom I communicated my specimens, says it has occurred among the willows.

In looking at the poplars soon after some recent cold rains I noticed that those buds which had pushed out the earliest, were so much injured that they would drop off almost at a touch. *Populus tremuloides*—the sterile aments—was in full bloom in Medford on the 29th of March, and *P. grandidentata* the following week.

It is gratifying to know that this genus is to be worked up anew by one so fully competent for the task as Mr. Watson, and that all confusion is likely to be cleared away, and the different species clearly and accurately defined.—Geo. E. Davenport, *Medford, Mass.*

On the Distribution of Certain Plants in Missouri; By G. C. Broadhead, of Pleasant Hill, Mo.—*Aquilegia Canadensis*, L., may be found early in the spring on shaded limestone hillsides in various parts of the State.

Aquilegia Canadensis var. *alba*, a rare and pretty plant was found on limestone slopes in Jackson county.

A. Canadensis, L., a pale yellow variety was found in Buchanan county.

Anemone Pennsylvanica, L. Found on Missouri bottoms from St. Louis county to Atchison county. On the upland and lowland prairies of Atchison and Holt counties it is very abundant, but in North Missouri I have not elsewhere observed it.

Anemone Caroliniana, Walt. From Cass county south along the western border of the State. It is found on prairies west and south. A purple variety is sometimes found in Cass and Bates counties. Dr. Engelman states that this closely resembles the European *A. stellata*. This is one of our earliest and prettiest flowers.

Hepatica triloba, Chaix. Only seen in Central and Eastern Missouri, on rocky and shaded hillsides.

Cocculus Carolinianus, DC. From Cole to Vernon and southwardly.

Brasenia peltata, Pursh. On ponds of Barton and Jasper.

Nymphæa odorata, Ait. Have only seen this beautiful and fragrant water plant in Vernon and Barton.

Nuphar advena, Ait. On ponds of Vernon and Bates. This is also quite common in Central Illinois.

Corydalis crystallina, Engl. From Cass southwardly; sometimes very abundant, especially on sandy slopes and rich prairie mounds. In North Missouri I have also found it in Livingston county, and it may occur at other localities in that district.

Cleome integrifolia. Found in Clay county, and also at Leavenworth, Kansas. Introduced from far West.

Viola pedata, L. Birds-foot violet or velvet violet. Rare in Western Missouri, but common on dry ridges in Eastern Missouri. Is very pretty.

Silene regia, Sims. In Jasper, Maries, Cole and southwardly. A rich crimson flower growng on thin rocky soil or oak barrens.

Talinum teretifolium, Pursh. Is nowhere common, but I have found it in many counties in South Missouri from St. Francois to Cole, Cass and Newton.

Callirhoe digitata, Nutt. Found in Lawrence and Jasper, on limestone soil where it is very abundant. In Barton county, just north, it is not found, but as soon as we leave its sandy soil and touch the limestone slopes of Jasper, the graceful and beautiful *Callirhoe* makes its appearance.

Polygala Nuttallii, T. & G., is common from Bates southwardly, but northwardly is very rare.

Polygala incarnata, is not common, but occasionally is found on the prairies.

Ptelea Trifoliata, L. From Cole northeast and Vernon south and east.

Hypericum ——? a species with globose head, is common in Eastern Missouri; does not occur in northwest, but is again found in Barton and southwardly.

Vitis riparia, Mx. The river grape grows along all the principal streams, ascending to the highest trees. A variety grows on prairie valleys and rugged limestone hillsides and on fences in fields in Northwest Missouri. On rich ground the berry is often sweet and good, in other localities it sometimes possesses a slightly bitter taste. It often ripens very irregularly on the same bunch. A berry being quite ripe while others may not be half grown. The berries are generally close on the bunch. This variety is often called slough grape.

A *Vitis*, not in Gray, although sometimes called Muscadine, is often found in Southern Missouri, also rarely found in one or two counties in eastern part of North Missouri, along rocky streams, berry ripening in August.

Rhamnus Caroliniana, Walt., I have only seen in Madison county.

Acer rubrum, L. Red maple, common on ridges and near streams in southeast Missouri. In North Missouri it has only been observed in Calaway county.

Tephrosia Virginiana, Pers. In Johnson, Bates and southwardly, and probably in Southeast Missouri.

Psoralea esculenta, Pursh. In Bates and southwardly on prairies. Root edible.

Psoralea melilotoides, Michx. In Vernon on prairies.

Vicia Americana, Muhl. In Bates, Platte, and in Northeast Kansas.

Clitoria Mariana, L., I have only found on dry pine ridges in Southeast Missouri.

Oxytropis Lamberti, Pursh. Only have seen it on bare bluffs in Atchison county in the extreme northwest, associated with *Pentstemon grandiflora*.

Prunus Virginiana, L., Choke cherry, is occasionally found in North Missouri north of the Hannibal & St. Jo. Railroad; also in the southern part of Buchanan, near Grand Pass, Saline county, but no further South.

Prunus Chicasa, Michx. Is not found in northwest Missouri, but abounds in St. Charles; is occasionally found in Saline, Lafayette and Bates, but is more common southwardly.

Prunus Americana, Marsh. There are several varieties of this plum; it is generally common throughout the northern part of the State. The fruit of this and the last is much valued. A variety with hard and acerb fruit and of no value is often found.

Neillia opulifolia, Benth & Hook. Nine-bark or seven-bark abounds in Eastern Missouri a little west of Jefferson City, thence through Henry, Vernon and southwardly, but is not found in northwest.

Potentilla Norvegica, L. I have only observed a single plant in Montgomery Co.

Rosa Caroliniana, L. I do not know that this rose is certainly found in Missouri, but I have seen a species (not in bloom) in Madison that may be it.

Rosa ——? I have found a species in Warren, Reynolds and Madison free from prickles, but have not seen it in blooom.

Cratægus, L. At least six or eight species are found in Missouri.

Œnothera sinuata, L., I have only found on sandy slopes in Vernon.

Œ. serrulata, Nutt. Found on "Bluff" hillsides in Atchison county.

Œnothera speciosa, Nutt. This showy plant is one of our handsomest when in bloom with its large pure white blossoms, but is only found on the western border of Missouri where it ranges from Jackson county southwardly.

Œnothera Missouriensis, Sims. This plant with its large handsome bright yellow corolla I have found on rocky slopes on prairies in Bates, and also in Green and Lawrence counties.

Ribes Cynosbati, L. A gooseberry with fruit armed with long prickles like a burr have found on rocky bluffs of Missouri, in Gasconade county, where there was but little soil.

Sedum stenopetalum, Pursh. Have only found this on cherty glades at Grand Falls, Newton county.

Hamamelis Virginica, L. Only in southeast Missouri where it is abundant.

Aralia spinosa, L. Hercules' club. Only found in southeast Missouri, ranging from Madison county southward. It is commonly called "Tear blanket."

Cornus Florida, L. Flowering dogwood. Not found much further west than Jefferson City. Common eastwardly on dry hills. Further west is not found north of Jasper county. In Northeast Missouri is rarely found west of the extreme eastern counties.

Cornus circinata, L., Her. Round leaved dogwood. Found only in eastern Missouri on rich moist hillsides.

Liquidambar Styraciflua, L. Sweet Gum. Common in Southeast Missouri, occurring from Madison county southwardly.

Nyssa multiflora, Wang. Black Gum. Common in Southeast Missouri. A few trees only have been seen in Maries county. It does not occur in Western or Northern Missouri. In Southern Illinois it is found no further north than the southern part of Fayette county. *Nyssa multiflora*, Wang., Tupelo or Sour Gum, and *N. uniflora*, Walt., the large Tupelo, are both said to abound in the swamps of Southeast Missouri.

Viburnum dentatum, L. Arrow wood. Is occasionally found in Monroe and Shelby counties, but neither in Northwest nor Southwest Missouri.

Fedia radiata, Michx. Bates county and southwardly.

MONOTROPA UNIFLORA, L.—In the April number of the BOTANICAL GAZETTE I noticed with considerable surprise a statement made by Mr. A. H. Young, of LaFayette, Ind., that *Monotropa uniflora*, L., or Indian Pipe, Ice-plant, Fit-plant so-called, possessed poisonous properties somewhat resembling the effects of *Rhus Toxicodendron*, L. Now this is certainly news to me, and which cannot fail to interest many others engaged in the study of Medical Botany. I am constrained to say, and an experience of twenty-three years of closest attention to this subject has verified my conclusions, that *Monotropa uniflora* is not possessed of any toxic properties, neither in its outward or inward application of the human system. It is a remedy of some repute with the Eclectic School of Medicine, and in "King's American Dispensatory" and "Howard's Botanic Medicine," is very highly recommended for overcoming nervous irritability, epilepsy, chorea, etc., when used in large doses inwardly of course, and for ophthalmic as well as other inflamations of delicate mucous surfaces outwardly applied, either in its fresh state or the preserved juice. I have myself used it very much in ordinary cases of inflamed eyes, both chronic and acute, and have never seen or even before heard any evil effects following the most indiscriminate use. Have applied it to the eyes of infants when only three days old, in *Ophthalmia purulenta infantum*, as well as in old age in

every variety of so-called constitutions, and even where not successfully employed, no ill effects have ever been observed thereafter.

I always keep on hand a quantity of this medicinal agent—in the form of a tincture or dried plant, and when I can obtain enough of it, the expressed juice. I will merely mention a case of ophthalmia cured incidentally by *Monotropa uniflora*. Fourteen years ago, it was in the early part of July, I went woodcock-shooting with two friends, near Hackensack, N. J., and while taking some luncheon in a beech grove along the course of Saddle River, found a large patch of ground literally covered with *Monotropa uniflora* in full bloom. I have never met with such another "find" of this plant in all of my frequent rambles and excursions made in search of it. It covered a space some five feet wide by nine feet long, a beautiful sight of snow-white stems and nodding flowers. Being in need of some just then, I proceeded to fill my game-bag, and to the question, what it was used for, answered "good for sore eyes," little thinking that the party addressed was suffering from a chronic inflamation of the eye lids, the edges of which had a very fiery red appearance. No sooner said, than he proceeded to take in his game-bag a supply also, and he made a very good use of it, as I ascertained afterwards. His inflamed lids were entirely cured in four weeks' time and has had no further trouble since, by applying the fresh juice of the stems he obtained while it lasted.

Now in view of all this, and coupling it with the fact, that in physical properties the *Monotropa* abounds in a mucilaginous and astringent property, either of which are quite innocuous, may it not have been possible that the young lady in question, who was supposed to have been poisoned by *Monotropa uniflora*, had come in contact with some of the far-spreading roots of *Rhus Toxicodendron*, in the attempt to lift or pluck the stem as close to the ground as possible? I have been poisoned in just such a manner myself, while collecting *Monotropa* as well as other plants. Now I have a wholesome fear of *Poison Rhus*, and manage to get poisoned with it anyhow several times every year—hardly ever by its leaves which I recognize at a long distance, never by its exhalations, but generally by coming in contact with its twining stems, or roots and fibrils so difficult to distinguish when underground or covered by decayed vegetable matter. The eruption following contact with *Poison Rhus*, when not accompanied by any swelling, only lasts a few days, just like that case referred to. I have often inoculated myself and others with *Poison Rhus* in order to antidote its disagreeable effects with different remedies, and have seen its action in every conceivable appearance.

But I am digressing from my subject. May it not have been possible that a few fibrils of *Rhus* were adherent to the scales or bracts of the stem, or passing through the matted fibrous rootlets of the *Monotropa*, which in handling could not have been avoided of being touched? May that lady not, therefore, have been an unsuspecting victim to the lurking poison of *Rhus Toxicodendron*?—Richard E. Kunze, M. D.

Ferns of Kentucky.—I have received from Mr. John Williamson, of Louisville, Ky., who is preparing a "Hand-Book" of the native ferns of that State, some etchings that have given to me, and others, so much pleasure, and which augur so well for the success of his work, that I am tempted to offer this notice in advance of publication.

These etchings are most charmingly and faithfully executed, and the graceful and successful management of the larger species in adapting them to the limited space they will occupy in the plates shows that Mr. Williamson possesses the true artistic feeling, and enters fully into the poetic nature of the beautiful plants that he is aiming to describe and portray.

The small species—especially *Trichomanes radicans*—have all the ease and natural grace of the ferns themselves, while the extra plates giving the mode of the fructification of each genus are very clearly and strongly depicted, and materially increase the value of the work as a whole.

I am unable to speak of the text of Mr. Williamson's work at the present time, but the collection of fifty-nine etchings with which he proposes to illustrate his book alone would be worth more than the price of the book to any fern student. I am delighted with them, and if the whole work is completed in the manner in which the etchings now in my possession indicate that it will be, then it cannot fail to prove a most valuable addition to our fern literature.

That the study of our native ferns is on the increase, and likely to become as popular as the same study is in England, where valuable and costly works on the subject have multiplied, the very gratifying success with which Prof. Eaton's splendid work on the "Ferns of North America" is meeting sufficiently indicates.

There is, therefore, ample room for such special hand books as Mr. Williamson's is intended to be, and I sincerely trust that the author will meet with a generous encouragement and success.—Geo. E. Davenport.

Southern Plants.—Mr. A. H. Curtiss, of Jacksonville, Florida, proposes to issue sets of dried plants of the Southern United States, in installments or fascicles of 250 species each. Several sets of the first fascicle have been sent to us, and are deposited here, and one of them is now being added to this Herbarium. I wish to say that the specimens are so well selected, so ample and complete, so well named—all with full printed labels in neat form—that it is a pleasure to look at them, and that I consider them very cheap indeed at the price fixed, namely $20 for 250 species.—Asa Gray *Herbarium of Harvard University.*

Bibliographical Index to North American Botany, by Sereno Watson. Part 1. Polypetalæ.—This has long been a sadly needed work, and Mr. Watson has gone through an amount of necessary labor for the benefit of botanists for which we can never be too grateful. The Botany west of the Mississippi is especially scattered and very few have access to books that can enable them to trace up the authorities and synonomy of all of our western plants. This work meets the trouble exactly, brings together all these scattered references and enables the botanist of the humblest means to possess the names, synonomy and authorities of all the species of North American plants. To keep pace with the changes that are being made in names is important, and we would advise all of our contributors to send for the work at once and then some will find out that the names they sometimes send us have gone out of date long ago. The work is published by the Smithsonian Institution and the price is fixed at $2.00 not half the cost. Copies can be had for that price by applying to Sereno Watson, Cambridge, Mass., Herbarium of Harvard University. The Polypetalæ of North America sum up as follows: Orders, 69; Genera, 545; Species, 3,038.

Botanical Contributions, by Asa Gray. This is No. 25 of these Contributions by Dr. Gray and we hope that the good work will go on for many years to come. It is divided into four parts. Part 1 is upon American *Elatines*. Instead of a single species of *Elatine* it seems that we have four: *E. triandra*, Schkuhr., *E. Americana*, Arn., *E. brachysperma*, n. sp., and *E. Californica*, n. sp. Part 2 contains the descriptions of two new genera of *Acanthaceæ*, named *Carlowrightia and Gatesia*. The former is represented by two species, found in Texas and Arizona; the latter by one species which ranges from Northern Alabama and Southern Tennessee to Eastern Texas. Part 3 is devoted to the description of new *Astragali*. We always expect a liberal share of this genus and we are not disappointed, for Dr. Gray here adds 17 new species. Part 4 contains "Miscellaneæ," being a description of various new species. Dr. Parry describes a *Boykinia*, and Dr. T. C. Porter, an *Actinella*, to which Dr. Gray adds a new species in each of the following genera: *Galium*, *Aster*, *Erigeron*, *Laphamia*, *Actinella*, and *Arnica*.

DENTARIA LACINIATA.—In Vol. I. of the GAZETTE I notice some remarks on varia tions in *Dentaria laciniata*, Muhl. A year ago while botanizing in Williamstown, Mass., I came across a few plants which had very much the aspect of *D. diphylla*, L., having the two alternate leaves with ovate leaflets, but the lateral leaflets of the stem leaves were 2-parted and the terminal 3-lobed; the lateral leaflets of the root leaves 2-divided and the terminal 3-parted. The divisions were cut-toothed or even lobed. The root stock seemed to be intermediate between that of *D. diphylla* and of *D. laciniata*. I consulted with the late Prof. Tenney and he thought it might be *D. laciniata*, but as this had never been found before in Williamstown, and *D. diphylla* was very common near it, I put it in my herbarium with the name *D. diphylla*, L. This spring I sent a specimen to Dr. Gray, who replied, "One of the least laciniate forms of *D. laciniata*." The "Manual" says: "All these species except the first (*D. maxima*, Nutt., *D.*, *heterophylla* Nutt., *D. laciniata*, Muhl., and *B. multifida*, Muhl.,) probably run together." The query arises in my mind, Why except the first? The "Manual" also says of *D. diphylla*, "petals white." I have found them often with a decidedly pink coloring. Perhaps this will be a partial answer to Mr. Meehan's question in the GAZETTE of February, 1877. I hope Botanists will study up the variations in this genus and report results.—C. H. FORD.

RECENT PUBLICATIONS.—*American Journal of Science and Arts*, April.—There is a short review of the "Flora of Tropical Africa; by Daniel Oliver. Vol. III. *Umbelliferæ* to *Ebenaceæ*." The order of Compositæ is represented by 117 genera, 17 being peculiar to this Flora. The only large genus is *Vernonia*, with 78 species.

The American Naturalist, May.—W. J. Beal has an interesting illustrated paper on the "Hairs and Glandular Hairs of Plants, their Forms and Uses."

Bulletin of the Torrey Botanical Club, March.—Prof. O. R. Willis has an article on the "Growth of Exogens," and Mr. N. L. Britton gives quite an extensive table on the subject of the fall of leaves.

List of Native and Exotic Ferns in the Green-Houses and Grounds of J. Warren Merrill, Cambridge, Mass.—This is quite a formidable list and surely shows great labor on the part of the proprietor and no sparing of expense. Mr. Merrill wishes to exchange dried fronds with those who have new varieties in duplicate.

A Catalogue of the Flowering Plants and Higher Cryptogams growing without cultivation within thirty miles of Yale College. Published by the Berzelius Society.—This is an elegantly published list prepared by the students of the Sheffield Scientific School. There is an introduction by Prof. D. C. Eaton, and also a good map of the territory embraced. The Phaenogams foot up 1,233 species, the Cryptogams (including *Acrogens*, *Musci and Hepaticæ*) 273, making 1,506 species enumerated in the catalogue.

Proceedings of the Academy of Natural Sciences of Philadelphia, Part III.—September, October, November and December, 1877.

Ferns of North America by Prof. Daniel C. Eaton, Parts IV and V.—This publi cation is making its appearance much more promptly than was expected and the double number before us shows as fine workmanship as any of the preceeding numbers. If anything, the plates are finer than before and the ferns lie as fresh before you as if just pressed. This number contains plates and descriptions of *Aspidium Nevadense*, Eaton (n. sp.), *Pellæa densa*, Hook., and *P. pulchella*, Fee., *Cheilanthes viscida*, Davenport, and *C. Clevelandii*, Eaton, *Asplenium unitum*, R. Br., *Ancimia Mexicana*, Klotzch, and *A. adiantifolia*, Swartz, *Asplenium Ruta-muraria*, L., and *A. Septentrionale*, Hoffm. Our only objection is that the plate of *Asplenium unitum* is so large that it does not allow any room for trimming when we come to bind.

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LETTER FROM A. FENDLER.—Dr. Asa Gray has kindly placed the following letter in our hands which will be of great interest to the readers of the GAZETTE:

NEAR PORT OF SPAIN, ISLAND OF TRINIDAD, Feb. 6th, 1878.

Prof. Asa Gray, M. D.:

MY DEAR SIR:— * * * The Botanic Garden, founded as early as the year 1827, contains some of the grandest and most magnificent specimens of the vegetable kingdom, introduced from all parts of the world, special attention being paid to the introduction and propagation of useful trees and plants. My health, though not on the retrograde, is far from being satisfactory. I have commenced putting the ferns into sets, but the rainy days during the greater part of January interfered very much, and December proved to be the dampest month of the whole season. I have now 111 species of Ferns and 5 of *Lycopodiaceæ*.

On the 20th of November the printer who printed the labels for my plants offered me a house and lot for sale which he owned in the same street that I lived on. Tired of being the tenant of uncomfortable quarters, I bought for $290 the house and lot thus offered me, Nov. 26th, and three days later moved into it. The lot is 46 feet in front by 120 feet deep, but the fences so dilapidated as to require new ones.

The house is 22 by 12 feet, is old, and needs considerable patching and repairing, all of which we (my brother and myself) intend to do with our own hands. A considerable part of it we have already done, the work claiming much of our time, that otherwise might have been devoted to collecting of plants.

To give you an idea of the vegetation which such a small parcel of land can support allow me to subjoin the following list of trees and plants the lot contains besides the house, leaving moreover plenty of vacant space in front of the house for a small flower garden. There are: 1 bread fruit tree; 1 Mango tree, (both very large trees); 2 Orange trees, 20–25 feet high, with plenty of sweet oranges for our own use; 1 Papaw-tree (*Carica Papaya*); 12 coffee trees all in bearing condition. Also, a few stalks of sugar cane; some small orange trees yet to be grafted; quite a number of banana plants of 2 or 3 kinds (some in fruit); Tanias (*Colocasia esculenta*), the eatable tubers of which are held in high estimation; Cassava (*Janipha Manihot*); 1 Star-apple tree (*Chrysophyllum Cainito*); and in one fence corner, not far from the house, a young bamboo bush with shoots 25 feet high, affording a grateful shade through most part of the day; 1 Guava tree; 1 tree-cotton plant (*Gossypium Barbadense*) full with blossoms and young fruit, its woody stem 10 inches in circumference and 10½ feet high. Besides these there are plants of less dimensions such as Ginger, 2 kinds of Ochra, 2 kinds Cayenne pepper; several arborescent pea- and bean-plants. To make this list more complete I have planted two young Cocoa-nut trees, said to begin bearing fruit in their 3d or 4th year, also some cuttings of a superior kind of grape-vine showing some growth already. The first bunch of fruit that we gathered from our banana plants contained 107 bananas of a delicious flavor, a still larger bunch touching nearly the ground will be ripe in a week or two, and others have just come into flowering. It is therefore natural enough that in my present position, having a home of my own, I should and do feel more at ease, more independent, and enjoy a multitude of little pleasures which I did not when living in a shanty-like house half as big as mine, in another man's dirty yard, crowded in on all sides by disagreeable folks, besides paying $4.25 house-rent a month. And

then there is in my present situation some satisfaction in going to the trees and gathering the ripe oranges whenever inclined to do so; and some pleasure also in watching the growth and development of leaves, fruit and flowers of strange tropical plants, all our own. Observing the vigor and rapidity of pushing forth of the banana's huge flower-stalk and the unfolding of its fruit, all so nicely arranged, no man at all mindful of the operations of nature can remain indifferent, cold and unmoved. This enormous activity cannot but gently remind him of a mighty power or powers working simultaneously within millions of cells—not a hap-hazard clash of atom against atom, which would end in inextricable confusion, but a working and weaving in unison, harmoniously and steadily, the crude material into objects of exquisite beauty and regularity; the plan adopted for each species vigorously followed up and adhered to in places thousands of miles apart, subject, however, now and then, to gradual modifications.

My new home is situated so as to bring me a little nearer town, is in a higher and drier locality, at the foot and in front of a prominent hill called "Belmont" on which a century ago the governors of the island loved to dwell in stately mansions, showing now nothing but the low remnants of a few ruined walls. This mountain when cleared of its high trees offers, no doubt, most splendid views on three sides. Towards the west it takes in the town of Port of Spain and its suburbs and a great extent of the Gulf of Paria; towards the north and east it exhibits the northern mountain ranges running out westward into a bold narrow strip, as well as the high promontories of the Venezuelan coast in the dim distance. Of late this once beautiful mountain has been altogether neglected, and suffered to run into a kind of wild bushy park; only on one side there is an open spot bare of trees, forming a kind of glade, and that is opposite to where I live, extending downwards to within ten yards of my front fence. I find this climate much more humid than that of Venezuela, and it takes all of a botanical collector's ingenuity to guard his dried specimens against the detrimental effects of dampness combined with high temperature. Even now in February, while trying to distribute my Ferns into sets, I sometimes have to gather them up in a hurry and lay them aside when a rain comes down without warning. I find that during December and January the night temperatures are considerable lower and the mid-day temperatures higher than during the summer months, descending in January as low as 64 deg. F., and rising as high as 97 deg. F. * * * .—A. Fendler.

On the Distribution of Certain Plants in Missouri; By G. C. Broadhead. (Concluded from page 53).—*Eupatorium perfoliatum*, L. Boneset. Has only been found in the eastern part of Missouri, as far west as Sullivan county, but not in southwest Missouri.

Silphium terebinthinaceum, L. This plant abounds on prairies in Fayette, Sangamon, Macon, Christian and Montgomery counties, Illinois; is found in southeast Missouri and rarely in north Missouri; observed in Ralls, in Maries, common in Cole, and found southwardly, but not in Western Missouri.

Coreopis grandiflora, Common in Bates and Vernon, but not found in north Missouri.

Pyrrhopappus grandiflorus, *Nutt.* In Bates, Vernon and eastern Missouri, but not in North or Northwestern Missouri.

Conoclinium cœlestinum, DC. Abounds in southeast Missouri, is also found in Cole and Bates counties and southwardly. Is a very pretty plant.

Vernonia Arkansana, DC., I have found in Jasper county, but not North.

Troximon cuspidatum, Pursh. In Jackson and Cass and probably southwardly.

Apogon humilis, *Ell.* In Cass and Bates.

Boltonia latisquama. I have only found in western and southeast Missouri.

Amphiachyris dracunculoides, DC. Found very abundantly in western border counties of Missouri, chiefly along roadsides.

Grindelia squarrosa, Dunal. I have only found on west line of Vernon, and in Barton and Jasper.

Specularia leptocarpa, Gray. This I have only found on rocky slopes in western counties of Southwest Missouri.

Diospyros Virginiana, L. Not common north but more abundant southwardly. Not found at all in northwest Missouri.

Bumelia lanuginosa, Pers. From Cole southwest to the northwest corner of Barton, but rare; in Jasper is common. In Cole it is a small rough looking bush, growing only on Magnesian limestone slopes; but on Spring River becomes a tree. It is not found north of Missouri River bluffs.

Ilex ——? A species with bright scarlet berries along the Mississippi to Lincoln county and up the Missouri to Osage river.

Tecoma radicans, Juss. Trumpet creeper. This vine is common in southeast Missouri Its northern boundary passes from Hannibal south-westwardly via Mexico to Glasgow, thence irregularly by the mouth of Grand River to the southern part of Bates county. Is one of our handsomest vines.

Catalpa bignonioides, Walt. Is a native of southeast Missouri. Its northern limit is St. Francois river, Madison county, although often planted for an ornamental tree further north.

Collinsia violacea, Nutt. Common in the southern part of Bates; is also found further south but not north. It is a very pretty plant.

Pentstemon grandiflorus, Frazer. This beautiful plant has ventured no farther into the State than the northwest part of Atchison county, where I observed it on the side of an almost bare bluff.

Monarda punctata L. Horsemint. This plant abounds on the dry hills of eastern Missouri. An infusion of the leaves is valuable as a sudorific.

Salvia azurea, Lam. Abundant in western Missouri, but not found in the eastern part.

Salvia lanceolata, Willd. Is abundant along roadsides in western Missouri; also found in similar localities in the eastern part of the State.

Salvia lyrata, L., is found in western Missouri.

Phlox acuminata, Pursh. Its northern limit is a short distance on the north side of the Missouri river to Jefferson City, thence to Vernon. It is occasionally found along the streams of southern and eastern Missouri.

Sabbatia angularis, Pursh. Common on dry ridges in Cole county to Vernon and southwardly. It is also found in the eastern counties of northeast Missouri.

Asclepias quadrifolia, Jacq. This plant I have only found in northeast Missouri.

Gentiana quinqueflora, Lam. This pretty Gentian I have only found on damp, shaded hillsides in Adair county.

Gentiana alba, Muhl. Cat. I have only found this in Ralls and Cass.

Gentiana puberula, Michx. This prairie plant is becoming quite rare and is one of our latest fall bloomers.

Solanum rostratum, Dunal. Found in Lafayette, Jackson, Cass and southwardly. Within about ten years has been introduced from the western plains.

Sassafras officinalis, Nees. The common sassafras is very abundant in northeast and southeast Missouri, but is not found in the northwest. Its western boundary passes from Monroe to Saline, thence through the eastern part of Cedar county to the southern part of Jasper. An infusion of the bark is much esteemed for purifying and thinning the blood. It has a pleasant aromatic odor.

Lindera Benzoin, Meisner. Spice bush. This is found along the Missouri as far west as Chariton county, thence southwest to Barton.

Dirca palustris, L. Leatherwood. Found along streams in Madison county. Has also been found on Lost Creek in Warren and near Fulton, Callaway county.

Euphorbia marginata, Pursh. This is found in gardens in western Missouri. It is a native of the western plains.

Phoradendron flavescens, Nutt. Found only in extreme southeast Missouri.

Ulmus alata, Michx. Whahoo elm. This abounds near the Iron mountain growing 40 to 50 feet high; further north it is rare. It is only occasionally found on the Missouri bluffs as far west as Callaway; but does not grow north or west.

Juglans cinerea, L. White walnut or butternut is quite common in eastern and southern Missouri, generally growing on hillsides or rich bottoms. Its northern and western limit is a line from Marion through the western part of Ralls to Mexico, Macon City and Kirksville to the northeast part of Sullivan county; thence to the mouth of Grand River and south-westwardly. Near the mouth of Tabbo creek in Lafayette it is quite abundant, but is neither found west, nor for many miles east.

Carya olivaformis, Nutt. Pecan is found on the Mississippi bottoms as far north as Pike county; on the Missouri it is not so abundant, but is occasionally found as far west as Platte and on Grand River as far as Utica. It is abundant on the Marais des Cygnes and other streams south.

Quercus alba, L. This is not found west of Nodaway River.

Q. imbricaria, Michx. In western Missouri, has not been observed south of Cass county.

Q. bicolor, Willd. Swamp White-Oak. Abundant on rich flat land in eastern and western Missouri, but in the west is not found south of Cass county.

Q. macrocarpa, Michx. A variety is common on hills north of H. & St. Jo. R. R. Further south it is only found on very rich ground or lowlands.

Q. heterophylla, Michx. I have found this oak in Shelby, DeKalb and Sullivan. The tree more nearly resembles *Q. palustris*, DuRoi, to which the leaves bear a resemblance, while others closely resemble those of *Q. imbricaria*, Michx. If a hybrid, it may be of those two. In Sullivan county I found it growing near Black Jack, Black Oak and Laurel Oak.

Fagus ferruginea, Ait. This is said to grow in southeast Missouri. In the northeast portion of Fayette county, Ill., I found two trees only of this species.

Carpinus Americana, Michx. Hornbeam or Water Beech. The northern and western limit extends from Ralls through Pike, Lincoln, Callaway, Boone, Cole and southward.

Betula nigra, L. Red Birch. Its western limit is as follows: through the western part of Harrison via Gentryville to Maysville, thence to Richmond, Ray county, southerly to Warrensburg, Johnson county, to the Marais des Cygnes, Bates county.

Alnus serrulata, Ait. Alder. A line drawn through Pike, Lincoln, Warren, Cole, and Cedar, would leave the Alder on the south.

Pinus mitis, Michx. Yellow pine. Is common in southern Missouri on flint and sandstone ridges, but does not grow north of the Atlantic & Pacific R. R.

Taxodium distichum, Richard. Cypress. Common only in swamps of southeast Missouri.

Juniperus Virginiana, L. Red Cedar. Is very common in most counties south of the Missouri river, but not so common northwardly and rarely found in western Missouri.

Habenaria leucophæa, Nutt., Western orchis, I have found in Jackson county and some other western counties.

Baptisia calycosa, *n. sp.*—Whole plant smooth except that the mucronate leaflets, stipules, bracts and calyx lobes are sparsely ciliate with long white hairs; stem and slender straight branches somewhat glaucous; stipules lanceolate, acute, persistent, 3–7 ribbed, half as long as the short petioled leaves, the sessile leaflets oblanceolate or obovate, obtuse; racemes terminating the branches, long and loose, the long (1–2 inches) and slender pedicels subtended by ovate lanceolate persistent bracts and also bibracteolate above the middle; calyx tube short, about one-fourth the length of the lanceolate spatulate foliaceous lobes, which are but little shorter than the yellow flowers. Legumes and base of stem not seen.

Dry pine barrens, St. Augustine, Florida.

Collected by Miss Mary C. Reynolds who has distributed many of the rare plants of that vicinity. Most nearly allied to *B. Leavenworthii*. Torr. & Gray, but abundantly distinct from that and other species and remarkable for the ciliate foliage and more especially for the foliaceous calyx lobes.—Wm. M. Canby, *Wilmington, Del.*

A review of the genus being desirable, specimens of all species in flower and fruit will be thankfully received and, if desired, returned. Those from the South and South-West are especially asked for.—W. M. C.

Baptisia sulphurea, *n. sp.*—Simple with spreading branches, glabrous; leaves on very short petioles, leaflets obovate, somewhat rhombic, obtuse or occasionally emarginate; stipules small, lanceolate, sub-persistent; spikes rather short with deciduous bracts and sulphur yellow spreading flowers; pedicels shorter than the broad campanulate calyx; broad ovate acutish teeth shorter than tube, woolly inside; style much longer than oval ovary (5 lines long); stipe of globose pod exsert.

Prairies, Tabaksi county, rare, flowers in May. *B. leucantha* differs by its larger growth, deciduous stipules, longer spikes of white flowers which open much later, and longer pedicels, short style (3 lines long) about as long as the linear ovary. *B. sphærocarpa* is well distinguished from our new species by its cæspitose growth, more erect branches, strict spikes with erect deep yellow flowers, pedicels shorter than calyx, the lobes of which are triangular lanceolate, very acute, as long as the narrower tube, and sparingly woolly inside; style much longer than the oval ovary (6 lines long); stipe of pod scarcely longer than calyx. The new species is so much intermediate between the two just mentioned that it suggests the idea of hybridity.—Geo. Engelmann.

Agave Virginica, L. False aloe. This plant I have only obtained from the top of a sandstone hill near Mine La Motte, Madison county.

Yucca angustifolia. Common only on bare "Bluff" hills of Atchison and Holt. Have found it no where else in Missouri. About 3 feet high and quite handsome. Is common further west.

Phragmites communis Trin. A reed 5 to 12 feet high, not common but where growing we find dense thickets. Found in marshy ground in Nodaway, Macon, Lafayette, Saline and Bates. The musk rats use it in the construction of their huts.

Pontederia cordata, L. This I have only found on ponds in Jasper county.

The chief timbered region of Missouri lies east of a line drawn from the northeast to the southwest corner of the State, although there are some large prairies east of this and some extensive tracts of woodland on the west.

[In determining genera and species I am under many obligations for assistance to Dr. Geo. Engelmann of St. Louis.]

Honorary Names in Scientific Nomenclature.—Editors Gazette.—A few weeks ago an article appeared in a widely circulated California Journal criticising my action in naming a new flower—*Gilia Parryæ*—"to honor a noble lady, who has done eminent service for botany," Mrs. Dr. C. C. Parry, late of California, now returned to Davenport, Iowa

As the criticism was couched in respectful language, and, moreover, as it contains a protest quite often heard, to the use of honorary names in science, I propose to discuss the subject a little and explain the propriety of admitting a few such names to the records of science in accordance with the practice of the masters in each, to the annoyance, it appears, of a few persons, who have evidently not given the subject much thought.

The plea for descriptive names is an old one, and many a scientist has kept strictly to the practice of giving them only, and by this very method has introduced confusion of the worst character into our nomenclature.

Let us look first to the origin of science and of scientific names. "Science is knowledge systematically arranged, so as to be conveniently taught, easily learned and readily applied." Art is this knowledge applied to use Coming down the steps of time, a master-mind arises one after another, seizes the materials at hand, arranges, names, publishes his book and departs, leaving his impress upon the science more or less indelible, according to the strength of his mind or the admiration of his followers. When all the known objects of a particular science or branch of a science are thus collected and compared, no difficulty is found in distinguishing each from each, and very appropriate names are generally given them. As research continues, however, and more genera and species are added, many of the established names are found no longer distinctive, others are vastly more applicable to the new forms, etc.

Again, descriptive names sometimes prove indefinite afterward, because of the accumulation of material, showing that the first name was given to an aberrant form or variety, totally different from the typical plant or animal.

Still again, the early scientists, working with inferior or no instruments, made continual errors, both of observation and interpretation, hence their names are now mainly inappropriate or misleading. With every re-organization of a science, there comes an attempt to correct these manifold errors, followed in turn by confusion and contest, measured by the amount of re-naming done and the weight of the new authority. We can never hope to have our scientific names crystallized into a nomenclature as permanent as the conglomerate rock until research has revealed every form of plant that grows, and every kind of animal that lives on the earth.

One of the first things we teach our pupils in science is the appropriateness and beauty of scientific names. We expatiate upon them with great pleasure and generally make the theme attractive, but no sooner does our tyro get well into the meshes of a science, than he finds one after another of its nice distinctions failing utterly, and that to follow the literal meanings would often totally mislead. Thus we learn to regard technical names, especially those coming down from the old masters, as distinctive only, not necessarily descriptive. Names denoting locality are often quite as unfortunate as descriptive ones. I could fill the GAZETTE with proofs that descriptive names as often fail in time to distinguish objects, as they continue to distinguish them. The name becomes merely a meaningless term, retained out of reverence for the author or to show the early conception of the object.

Linnæus and Cuvier—worthies held in reverence by every true lover of nature—were the pioneers of modern research, and no better proof of their ability is needed than the statement that they studied and gave scientific names to every plant and animal known at their day, many of which names are retained to the present and, no doubt, a few will be until the end of time; but, as a matter of history, nine-tenths of their names have been quietly dropped or boldly overruled by subsequent scientists

The thing aimed at in nomenclature is *distinctiveness*; the giving of such a name as will forever distinguish the object from every other in creation. In the naming of large families the distinctions become less prominent and certain, while upon the accession of a large number of species, the whole family has again and again to be revised. Each scientist aims as far as possible to give descriptive names, but each learns from his predecessors how meaningless most of them become; so he casts about him for other names that will *stick* he hopes, through time.

And right here comes in one of the most beautiful and touching characteristics of the true scientist—the recognition of the labors and merits of others. Full well he knows the toil and exposure of the explorer, the study and pains-taking of the discoverer; and also how illy both are requited with this world's goods; so he is ever ready to give the poor meed of honor to whom honor is due. With an object before him, the result of severe exploration or research, how naturally that the discoverer's name should be indelibly associated with the new object; and with what love and loyalty he coins it into a technical distinction for the object given by unmeasured toil to science and the world.

Generic names are Latin nouns arbitrarily formed often from some medicinal or other virtue, real or supposed, or some resemblance to other objects, or they are derived from a country, or they are old classic words of no meaning whatever; and lastly they are sometimes coined from the name of a distinguished scientist or patron of science. Specific names are Latin adjectives, singular in number and agreeing in gender with the name of their genus. They are mostly founded upon distinctive characters, resemblances, uses, etc., and quite often are commemorative names. Specific honorary names are of two kinds: possessive and dedicative. If the person honored is the discoverer, his or her name is used in the form of the Latin genitive (or possessive case), as, *Viola Nuttallii*, *Cheilanthes Cooperæ*. If the name is conferred as a recognition of merit, it is used as an adjective ending in *nus*, *na* or *num*; as *Ceanothus Veitchianus*, *Cnicus Mariana*, and *Lilium Bloomerianum*, when the object is said to be *dedicated*

The number of commemorative names of necessity will always be few compared with descriptive ones, but as every science has a small number it is quite certain that each will always retain a few in accordance with the law of human kindness, which, it is hoped, will always meet return.

What warm heart does not cheerfully acquiesce in the grateful affection of eminent scientists who have dedicated certain small genera of plants or animals to Linnæus, Cuvier, Jussieu, DeCandolle, Levoisier, Maximowiex, Agassiz, Adanson, Audu-

bon, Berlandier, Bentham, Brown, Bigelow, Baykin, Brewer, Canby, Cary, Chapman, Clayton, Chamisso, Clinton, Dahl, Davy, Dana, Descarte, Engelmann, Eaton, Eschscholtz, Douglas, Faraday, Franklin, Fuller, Gay-Lussac Gray, Hooker, Hudson, James, Jefferson, Kuhn, Lamark, Lavater, Le Conte, Lindley, Ludwig, Marsh, Marshall, Menzies, Michaux, Mitchell, Nuttall, Olney, Packard, Pursh, Richardson, Riley, Sprengel, Sullivant, Silliman, Thurber, Torrey, Tournefort, Tyndall, Wood, Watson, Wilson, Willdenow, Whitney, Wright, Parry, Palmer; and our Californians, Bolander, Kellogg, Bloomer, Davidson, Harford, Harkness, and Edwards.

Please permit a few words in regard to my practice of suggesting names and how I commenced it. In September, of 1873, I was informed that a plant had been named for me by Dr. Asa Gray, of Harvard University, at the instance of Prof. Bolander, who had recently been botanizing in Sierra valley with me. I was thus ushered into the large and interesting family of *Astragalus*. I found myself in good company. There was Pursh, Gray, Hooker, Geyer, Coulter, Menzies, Douglas, Horn, Anderson, Morton, Parry, Whitney and Bolander.

But other good people to my knowledge were outside; I at once determined to try to get them within. I traveled extensively, collected largely and noted carefully. With every package of plants sent to Dr. Gray went up petitions of this import: "Should such and such a plant prove new, and it does not name itself by obvious characters (which is always best), please dedicate it to so and so, for the following reasons," etc.

My petitions have often been granted, and with great joy I have celebrated the admission one after another into the family of *Astragalus* alone, Mrs. Pulsifer-Ames, Dr. D. G. Webber, Prof. E. L. Case and Mrs. R M. Austin; and, did your readers know these parties, I don't think one would protest.

Now, Dr. Gray, the generous soul, who confers all these honors, has been a writer of books for 20 years. He is the leading botanist of America, and stands even with Dr. Hooker, of England, as authority in Europe. He is not only the best authority in botany, but in zoology as well. Almost every page of "Webster's Unabridged" bears his name as authority for scientific terms. In view of these facts, I submit that the deliberate acts of one so eminent and of such universal capacity, are far above criticism, in any particular, by common minds; and I rejoice that his greatness is so admirably illustrated by his goodness. With what charming beauty stands out his generous character portrayed against the dark background of selfish money-getters, city plunderers and corporation despots, so amply filling the picture of every-day life in this naughty world.

I am astonished and almost overwhelmed by the latest kindness of Dr. Gray in conferring upon me the crowning honor of a new genus.

I beg the readers pardon for the personal mention in what follows, but the sentences so finely illustrate the animus of good Dr. Gray and his enthusiastic manner of conferring honors, that I cannot forbear offering them for record in your columns.

During the past winter, while studying natural history at Webber lake (where also I celebrated, with bon-fires for three months, the victory of *Gilia Parryæ*), a certain little plant found the May before, on the Mohave river, along with *Gilia Parryæ* and other new things, attracted frequent examination, and every time left me more and more puzzled to determine where it belonged in our new botany of California. At last I took courage to describe it briefly and send my only remaining specimen to Dr. Gray, to whom I had sent a plant at the time of collecting, but who, for some reason, had omitted to report

As afterward appeared, at the same time my letter was on its way to Dr. G. asking for a name, a letter from him was on its way to Dr. Parry, at Davenport, Iowa, stating that he had just come upon a misiaid plant "that was received May 16th, 1866, from our

worthy Lemmon," and which "proves to be not a *Coldenia*, as at first supposed, but a neat, new genus," etc. "And now Lemmon's devotion to Mrs. Parry," (alluding to *Gilia Parryæ*) "is rewarded. I mean to rejoice the coccles of his sensitive heart, and do a just deed by naming this humble but interesting plant, *Lemmonia Californica!* I take the specific name," (*Californica*,) he adds, "in order to send Lemmon's name down to posterity along with that of his adopted State, in which the most of his arduous labor for botany has been performed. Please forward this letter to him," he concludes, "with my continued regards and a rousing cheer for *Lemmonia Californica!* Hurrah! Yours, ever, A. Gray."—J. G Lemmon, *Sierra Valley, Cal.*

Flora of North America, by Asa Gray.—This is part of a work that we have all been waiting for and is one that must be in the library of every working botanist. The Flora of North America by Torrey and Gray stopped, thirty-five years ago, at the end of the order *Compositæ*. This part is the first of Volume second, containing *Gamopetalæ* after *Compositæ*. The intention is to conclude the second volume with two more parts, Part II containing *Apetalæ* and *Gymnospermæ*, and Part III, *Monocotyledones* and Vascular Cryptogamia. Then the first volume will be worked over and brought to date. Thus the whole work will consist of two volumes, imperial octavo, of about 1,200 pages each. It is hardly necessary to refer to the style and general arrangement of the volume. The name of its author guarantees to us the most philosophical arrangement along with terse and lucid descriptions It is a fit crowning work for a long life devoted to the earnest study of North American botany. We hope that the demands for this volume will encourage Dr. Gray to prepare for an early publication of the remaining parts. The price is fixed at the very low sum of five dollars. For this sum, the *Curator of Harvard University Herbarium, Cambridge, Mass.*, will send a copy by mail, paying the postage, to any post office address within the United States. The retail price at the publishers is six dollars. Let me urge upon all the readers of the Gazette who have not already provided themselves with copies, to send at once for this volume, for it marks an era in the history of North American botany and does away with the necessity of a whole library of government reports, special contributions, proceedings of societies, etc., etc.

Recent Publications.—We have space merely to acknowledge the receipt of a few of the journals and special publications sent to this office since the last issue.

American Journal of Science and Arts, May and June.

American Naturalist, June.

Bulletin of the Torrey Botanical Club, April and May.

The Valley Naturalist, May and June.

Proceedings of the Davenport Academy of Natural Sciences, Vol. II, Part I.

Catalogue of the Phænogamous and Cryptogamous Plants (including Lichens) *of the Dominion of Canada*, John Macoun, Belleville, Ont. Price 35 cents; four for one dollar.

La Belgique Horticole, January, February and March, 1878.

Actes du Congres de Botanique Horticole reuni a Bruxelles, May, 1876. M. Edouard Morren, Secretary.

Field and Forest, March.

Tsuda's Agricultural Monthly, Tokio, Japan, 4 Nos.

COLUMBIA COLLEGE HERBARIUM NEW YORK.

BOTANICAL GAZETTE.

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BAPTISIA CALYCOSA, *n. sp.*—Whole plant smooth except that the mucronate leaflets, stipules, bracts and calyx lobes are sparsely ciliate with long white hairs; stem and slender straight branches somewhat glaucous; stipules lanceolate, acute, persistent, 3–7 ribbed, half as long as the short petioled leaves, the sessile leaflets oblanceolate or obovate, obtuse; racemes terminating the branches, long and loose, the long (1–2 inches) and slender pedicels subtended by ovate lanceolate persistent bracts and also bibracteolate above the middle; calyx tube short, about one-fourth the length of the lanceolate spatulate foliaceous lobes, which are but little shorter than the yellow flowers. Legumes and base of stem not seen.

Dry pine barrens, St. Augustine, Florida.

Collected by Miss Mary C. Reynolds who has distributed many of the rare plants of that vicinity. Most nearly allied to *B. Lecontii*, Torr. & Gray, but abundantly distinct from that and other species and remarkable for the ciliate foliage and more especially for the foliaceous calyx lobes.—WM. M. CANBY, *Wilmington, Del.*

A review of the genus being desirable, specimens of all species in flower and fruit will be thankfully received and, if desired, returned. Those from the South and South-West are especially asked for.—W. M. C.

BAPTISIA SULPHUREA, *n. sp.*—Simple with spreading branches, glabrous; leaves on very short petioles, leaflets obovate, somewhat rhombic, obtuse or occasionally emarginate; stipules small, lanceolate, sub-persistent; spikes rather short with deciduous bracts and sulphur yellow spreading flowers; pedicels shorter than the broad campanulate calyx; broad ovate acutish teeth shorter than tube, woolly inside; style much longer than oval ovary (5 lines long); stipe of globose pod exsert.

Prairies, Tabaksi county, collected by Mr. Geo. D. Butler, rare, flowers in May. Indian Territory. *B. leucantha* differs by its larger growth, deciduous stipules, longer spikes of white flowers which open much later, and longer pedicels, short style (3 lines long) about as long as the linear ovary. *B. sphærocarpa* is well distinguished from our new species by its cæspitose growth, more erect branches, strict spikes with erect deep yellow flowers, pedicels shorter than calyx, the lobes of which are triangular lanceolate, very acute, as long as the narrower tube, and sparingly woolly inside; style much longer than the oval ovary (6 lines long); stipe of pod scarcely longer than calyx. The new species being exactly intermediate between the two just mentioned suggests the idea of hybridity.—GEO. ENGELMANN.

A LIST OF SOME OF THE MOST INTERESTING SPECIES OF PLANTS COLLECTED IN THE INDIAN TERRITORY; BY GEO. D. BUTLER.—[When the locality is not mentioned it is Limestone Gap.]

Clematis Pitcheri, T. & G. Thickets.

Anemone Caroliniana, Walt. Common in prairies.

Ranunculus pusillus, Poir. Pools, not uncommon.

Delphinium azureum, Mx. Flowers white with a brown or greenish eye, never blue in this region; leaves thicker, and their divisions narrower than in Iowa specimens. (*D. virescens?* Nutt.). Prairies, common.

Cocculus Carolinus, DC. Common.

Calyocarpum Lyoni, Nutt. Rather rare.

Corydalis aurea, Willd., var. *micrantha*, Engelm. Agrees with the exception that the flowers are large, as in the normal *C. aurea*. Rare, growing in very rich soil.

Corydalis crystallina, Engelm. Prairie knolls, common.

Nasturtium tanacetifolium, H. & A. Thickets and fence rows.

Nasturtium sinuatum, Nutt. Arkansas river, rare.

Erysimum asperum, DC., var. *Arkansanum*, Nutt. Limestone.

Selenia aurea, Nutt. 2–6 inches high; flowers abundant and large for the family. Sulphate flats in early spring, rare.

Draba cuneifolia, Nutt. Limestone.

Cleomella angustifolia, Torr. Roadsides, apparently introduced.

Cleome pungens, Willd. Fort Smith, introduced.

Viola pubescens, Ait., var. *eriocarpa*, Nutt. Alluvial woods.

Arenaria Pitcheri, Nutt. A variable species, usually smooth, with linear, fleshy leaves. Damp soil, common. A very pubescent and glutinous form which grows on dry prairie hills and is a month earlier, I have named var. *pubescens*. Leaves and calyx lobes wider and thinner.

Stellaria Nuttallii, T. & G. Sulphate flats.

Two *Saginae*: One common in prairies with decumbent stems, and petals spreading horizontally, (*S. decumbens*? Gr.); the other rare, on high timbered ridges, with erect stems and ascending petals, (*S. Linnaei*, Presl.).

Portulaca pilosa, L. Sulphate flats, rare.

Talinum teretifolium, Pursh. Sulphate flats.

Callirrhoe digitata, Gr. Variable. The leaves are sometimes nearly entire; the white to purple flowers ½–2 inches in diameter; petals either entire or cut into a fringe. The large spindle-shaped to napiform roots form the chief subsistence of wild hogs during the spring months.

Callirrhoe pedata, T. & G. A month later, taller, and variable only in the size of the red purple flowers which are ¾ to 2 inches in diameter. Prairies and open woods.

Rhus Toxicodendron, L. Occurs as a vine climbing trees or rocks; as a shrub ½–1 foot high in dry woods; and as a shrub 4–8 feet high along rocky streams.

Rhus aromatica, Ait., var. *trilobata*, Nutt. Heavy scented, odor very disagreeable; flowers and fruit larger than in *R. aromatica*. Limestone cliffs. I believe it is poisonous.

Vitis æstivalis, Mx. The most common variety is the Post Oak Grape, which grows in sandy woods, climbing very little; berry ripe in June, as large as, and more pleasant to the taste than the Northern Fox Grape with which this has sometimes been confounded.

Sapindus marginatus, Willd. Banks of streams, uncommon.

Æsculus arguta, Buckley. May be a variety of *Æ. glabra*, but is pubescent, always shrubby, 2–8 feet high; leaflets 7, scarcely petioled. Openings in woods near banks of streams. Also in Wood county, Texas.

Trifolium reflexum, L. Arkansas river.

Trifolium stoloniferum, Muhl. Alluvial woods.

Hosackia Purshiana, Benth. Sulphate flats and dry woods.

Psoralea esculenta, Pursh. Dry sandy woods, rare.

Petalostemon multiflorus, Nutt. A month later than *P. candidus*. Limestone.

Robinia Pseudacacia, L. Here it is a shrub 4–8 feet high, flowering profusely. Limestone.

Tephrosia onobrychoides, Nutt. Dry prairies.

Indigofera Anil, L. Introduced.

Sesbania macrocarpa, Muhl. Poteau river.

Astragalus caryocarpus, Ker. Limestone.

Astragalus Plattensis, Nutt. Prairies.

Astragalus distortus, T. & G. Dry prairie hills.

Astragalus Nuttallianus, DC. A very small species, the earliest in bloom.

Vicia micrantha, Nutt. Forms a dense pubescent mat in open bare spots, but in thickets it is a delicate little vine, seldom climbing more than a foot.

Lathyrus pusillus, Ell. This is the form which has been named *L. Engelmanni* in Europe. Thickets and damp prairies.

Phaseolus diversifolius, Pers. Dry woods.

Phaseolus pauciflorus, Benth. Dry woods.

Baptisia australis, R. Br. Prairies.

Baptisia leucophea, Nutt. Prairies.

Baptisia leucantha, T. & G. Prairies.

Baptisia sulphurea, Engelm., *n. sp.*, Bot. Gazette, *Vol.* III, *p.* 65. Prairies Tabaksi county, rare, flowers in May.

Baptisia sphærocarpa, Nutt. In patches, 1–3 feet high, unchanged in drying. Legume variable in shape, prairies.

Baptisia villosa, Ell., at least as to Nuttall's Arkansas plant, see Torr. & Gr. Fl. 1, p. 384. Stem short, with spreading branches; branches and leaves villous, the younger ones silky; leaves on petioles 3 lines long; leaflets oblanceolate to obovate-oblong, with wedge-shaped, attenuated base, obtuse, the lower ones 2–3 inches long; stipules foliaceous, $\frac{3}{4}$–$1\frac{1}{2}$ inches long and $\frac{1}{4}$ inch wide, persistent, lanceolate, acute; bracts caducous; flowers yellow, borne in short terminal racemes, on erect pedicels 3–6 lines long; calyx teeth triangular lanceolate, nearly as long as the turbinate tube; ovary hairy; fruit unknown. Near *B. lanceolata*. Prairies, Tabaksi county, rare.

Cassia obtusifolia, L. Fort Smith, introduced.

Schrankia runcinata, Willd. Prairies, common.

Desmanthus brachylobus, Benth. Prairies and woods.

Acacia lutea, Lea. Sulphate flats.

Acacia hirta, Nutt. Limestone.

Prunus Chicasa, Mx. Thickets.

Prunus Chicasa, Mx., var. Texana, Engelm. (*P. Texana*, Scheele.) Leaves ovate, acuminate, pubescent, with closely appressed, incurved, glandular serratures, $1\frac{1}{2}$–$2\frac{1}{2}$ inches long; peduncles 4 lines long; calyx pubescent; drupe globose, small, 6–7 lines in diameter, red. A shrub 1–$2\frac{1}{2}$ feet high, growing in patches in prairies. It blooms about April 1st. Fruit ripens about July 1st, but is seldom produced. ("More abundant and larger in Texas. *P. rivularis*, Scheele, is another form of *P. Chicasa* undistinguishable from this." Engelmann.)

Prunus gracilis, Eng. and Gr. *Pt. Lindh.* 1, *p.* 36. With thicker, broader and often obtusish leaves, $\frac{3}{4}$–$1\frac{1}{2}$ inches long and $\frac{1}{2}$–1 inch broad, with spreading mucronate teeth (or nearly so) above, paler, reticulated and downy beneath; drupe globose, 6 lines in diameter; stone thick, rather blunt, with a protuberant, thick and rounded margin. A shrub $1\frac{1}{2}$–2 feet high. Sandy woods and prairies, rare. Very near the north-eastern *P. maritima*.

Gillenia stipulacea, Nutt. Common.

Sanguisorba annua, Nutt. Sulphate flats, where it is erect and simple or sparingly branched; fields, where it is decumbent and much branched.

Rosa setigera, Mx. Common.

Rosa Carolina, L. Arkansas river.

Rosa lucida, Ehrh. (*R. parviflora*, Ehrh.) Dry woods, scarce.

Rosa foliolosa, Nutt. Subterranean stems stoloniferous and widely spreading; erect branches a foot high or less, bearing in the first year a single or sometimes 2 or 3 flowers and generally dying down to the base; large pod depressed-globose, like the

short peduncle usually with a few gland-bearing bristles, its calyx lobes erect or slightly spreading, at last deciduous, bristly glandular, the outer somewhat pinnatifid. Dry open woods and prairies.

Ribes aureum, Pursh. Limestone cliffs.

Saxifraga Virginiensis, Mx. The plant occurring in Atoka county is low (1–3 inches high), the capsule mostly 3-beaked, flowers clustered even in fruit. Wet prairies, common. The normal form occurs on Arkansas river.

Sedum sparsiflorum, Nutt. Sulphate flats, common. Annual.

Gaura sinuata, Nutt. Sulphate flats.

Œnothera rhombipetala, Nutt. Arkansas river.

Œnothera speciosa, Nutt. Rich prairies, whether limestone or not. Rather common.

Œnothera serrulata, Nutt. Prairies, rare.

Œnothera linifolia, Nutt. Sulphate flats.

Mentzelia oligosperma, Nutt. Limestone cliffs.

Mammillaria Nuttallii, Engelm. Dry hills in prairies.

Melothria pendula, L. Fort Smith.

Daucus pusillus. Sulphate flats and dry woods. Common.

Trepocarpus Æthusa, Nutt. Has the strong odor of carrot throughout. Fruit large. Thickets, not uncommon.

Polytænia Nuttallii, DC. Prairies, common.

Peucedanum foeniculaceum, Nutt. Dry ridges. Mostly in limestone where it is common.

Cynosciadum pinnatum, DC. Leaves mostly lanceolate and nearly entire. Large specimens have some of the leaves pinnate. Pools, rather common.

Apium (Amoselinum) Popei, (Gray). Sulphate flats where it is 1–2 inches high, and thickets where it is 4–6 inches high, common. Umbels oppositifoliate.

Apium (Leptocaulis) patens, (Gray). Arkansas river.

Apium (Leptocaulis) divaricatus, (Gray). Blue county.

Chærophyllum procumbens, Lam. Very common.

Osmorrhiza longistylis, DC. Alluvial woods, rare.

Symphoricarpus vulgaris, Mx. Very common.

Galium virgatum, Nutt. Limestone bluffs, uncommon.

Fedia radiata, Mx. Very common.

Fedia longiflora, T. & G. Tube of the corolla rose-purple, the limb white; flowers larger than in any other of our Fedias. Limestone cliffs.

Fedia Nuttallii, T & G. Flowers also large, but narrower than in *F. longiflora*; bracts variable, entire or red ciliate. Readily distinguished from any other species by a curious spur like appendage on the side of the corolla tube. Springy places and sulphate flats.—[To be continued.]

Fresh Water Algæ.—The question is often asked, Why are there so few who engage in the study of the Fresh Water Algæ? Is it devoid of interest? The Algæ are ranked as a higher order of plants than the Fungi and the Lichens, yet of these there are numerous students; if they find so much to interest, the Algæ ought to claim at least an equal share of attention. Specimens may be collected in almost all localities in common with other forms of Cryptogamic plants, and they are found at all seasons of the year. Early spring brings forth its varieties of livid green Higeocloniams and Mothrines which lived protected under the snow and ice during the vigorous cold of winter; and many varieties of Cacci, without protection maintain their perfect forms and colors; later, as the more genial sun reinvigorates the vegetable kingdom these small but perfect plants are developed everywhere in places supplied with sufficient mois-

ure, with wonderful rapidity. The hot sun of June and July is no hindrance but accelerates the growth; now rivers, ponds and pools are made green with the abundance of many of the more common forms; the sultry weather of August and September is favorable to the development of other varieties on moist or shaded grounds, old wood, walls, trunks of trees, &c. There is no season until the earth is again covered with snow and the rivers are bound up with thick layers of ice, in which the collector is not richly rewarded in his researches. Specimens are easily preserved. When it can be done they ought to be examined when fresh, but dried and laid aside for years, they may be taken up and examined with profit. I was particularly struck with this fact, recently examining a collection made in part, some ten and fifteen years back. The specimens retained their generic and specific characters well.

Is variety, delicacy or beauty an object, they are not excelled by the Fungi or Lichens, nor by their nearer kin the larger marine plants, that attract so much attention from the lovers of the beautiful; true, they are generally very small; the eye needs assistance and generally a good compound microscope, but the admiration and the wonder excited is none the less. A single drop of carefully collected pond water will often be found to contain a score or more of smaller forms, all perfect in symmetry, beautifully shaded with chlorophyl, or variously tinted with orange-yellow, purple or golden red. So small and yet so perfect; the wonders of the Divine mind are no less evident here than in the greater works of His design.

But in studying the life history of these plants the mind is constantly fed with new enjoyments. I cannot forget the first time I observed the "birth of an Œdogonium." I had under the microscope a number of filaments of a plant of this genus; I had been studying the form and character of the oogonias and now was taking the proportions of the length and breadth of the cells, when I saw two cells separating at the joint, and a sack-like form slightly protruding; it was something new to me; I kept my eye on it; it moved very slowly but perceptibly, gradually protruding more and more; soon it was quite out, distorted in form from the pressure it was subjected to in passing through so narrow a passage; in less than five minutes more it changed to a perfect sphere, a head became evident in a somewhat raised colorless point with two cilia on opposite sides of it, these begin to move, the vibration becomes more rapid and communicates motion to the new born thing, it oscillates, and off it darts. In less than fifteen minutes others come to life, and now there are four or five of these "zoospores" darting about in their narrow confines in the field of the microscope. We need not wonder that such men as Ehrenberg and others classified these living spores with the infusoria, they appear to possess volition, how they dart about, but always avoid each other, never collide; the period of their existence is short, in less than half an hour they come to rest, the animal goes back again to the vegetable, they change in form from spherical to oblong, then the heads or ciliated ends gradually put forth prong-like projections, these are the rootlets of a new plant which take hold of any suitable substance near by; the plants elongate by developing cell to cell until we see duplicates of the original mother plant.

The life history of these plants is full of interest and very important for classification, and a large field is here open for investigation.

Have you a desire to make a beginning, where shall you get specimens? Are there near by larger or smaller slow streams, or sheltered angles beside more rapid waters, these are sure to contain something, Spirogyra, Cladophora, Microspora or some other of the common things; or stagnant pools will furnish Œdogonium of some variety, Zygnema, Horniospora, &c., or if you have a pond with Utricularia, or Myriophyllum, gather a quantity, take it hence and wash it by shaking it well in a bucket of clean water, let it settle, pour off the surface until you have a tolerably thick sediment, this will certainly contain some, perhaps very many varieties, of Desmids, beautiful

objects for examination under the microscope; or are there damp, or dripping rocks, gather some of the crusts, or gelatinous coatings, you will find in them Sirosiphon, Scytonema, perhaps Glococapsa, Palmella, or Nostocs and the like. We rarely find one plant alone, generally two or three forms intermingled. The field is so large, the variety so great, the forms so diversified, yet all so perfect in symmetry, the study cannot fail to impress the mind and often excite the utmost enthusiasm. The study has been much neglected, there is much to be worked up. Europe boast of upward of two thousand species. We should find no less; but hitherto we have only seven hundred species recorded. Much remains undone.—Francis Wolle, *Bethlehem, Pa.*

Erratum.—In my list of plants from the Indian Territory contained in the Gazette for June, pp. 49, 50, the following errors have been detected. The reader will please correct them:

Delphinium occidentale. This is *D. azureum*, Mx., a very canescent variety.

Lepidium integrifolium, should be read *L. intermedium*, Gray. The leaves are entire.

Astragalus recticarpus. This plant is a form of *Indigofera leptosepala*, Nutt. with very narrow leaflets.

Elymus Canadensis, var. *minimus* is *Hordeum pusillum*, Nutt.

Spiranthes Romanzoviana. This plant is now thought to be an undescribed species. More time and material are wanted for its recognition.—A. Wood.

Polytrichum tenue Menzies, Lindb.=*P. Pennsylvanicum*, Hedw.=*Pogonatum brevicaule* Brid.; Sulliv. Icones.

Polytrichum brachyphyllum, Michx.=*Pogonatum brachyphyllum*, Beauv; Sulliv. Icones.

Probably the male plants of both these species always occur, in their season, in the same localities where the female plants abound. In *P. tenue* the male plants are often mixed, yet they evidently are not developed in the same *nidus*. The male plants are very numerous and conspicuous, apparently acaulescent, but projecting a kind of stem, which is clothed with the confervoid filaments, into the earth, simple or branched. Leaves dark brown or brownish red, numerous and crowded into globular or rosulate heads, spatulate or flabelliform, mucronately acuminate, strongly costate, subdentate or crenate, often subundulate. Antheridia very numerous, paraphysate. (Vide Musc. Appalach, No. 233.) The male plants mature in July and August; the female in September and October. In *P. brachyphyllum* the male and female plants grow together (always?) and apparently are developed in the same *nidus*. The male plants are extremely minute, being invisible to the naked eye, and only visible by the aid of a good lens as mere reddish specks on the surface of the more highly developed prothallus. They are ovate, acaulescent, cradiculose (not being immediately attached to the ground). Leaves few (about 5), red or reddish brown, lax, ecostate, entire obtuse or obtusish, the outer ones roundish, the inner ones (often narrowly) spatulate. Antheridia few (about 4), short and thick (oblong-cylindrical), eparaphysate. The male plants mature in early spring (in the Southern States) the female in late autumn (in New Jersey).—C. F. Austin.

Darlingtonia Californica, Torr.—In September, 1874, while observing the habits of Darlingtonia, I found a great many small white larvæ in the liquid and insect mass at the bottom of the tubes. They were found in all the tubes, even those of the seedling leaves contained from one to three, while in the larger leaves they numbered hundreds. I tried, in vain, to find out what insect produced the larvæ and to note any change in them. They are always present winter and summer, and even active even when the thermometer marks zero. They make their appearance in the young leaves

soon after they begin to secrete the clear liquid in the tubes before the orifice of the hoods are open, and no trace of any insects in the liquid for them to feed on. If flies, or small bits of fresh meat be placed in the tubes having closed hoods, the larvæ will immediately begin feeding on them, and if the pieces are no larger than grains of wheat nothing will remain after forty-eight hours

In February, 1875, I made an examination of the larvæ when the thermometer was a little below zero, and the liquid in the tubes was frozen down to the insect mass. I found them numerous and active. I selected four tubes of average size and took them home for the purpose of numbering the larvæ. In the first was 59; second 82; third 168, and fourth 206.—R. M. Austin, *Crescent Mills, California.*

Letter from Dr. Louis Watson, Ellis, Kansas.—We are permitted to place the following interesting letter before our readers through the courtesy of Mr. Sereno Watson:

"The principal matter I wished to mention to you in relation to Botany, is the great inequality of the abundance of certain plants upon these plains, in different years. In 1872 or 3, *Malvastrum coccineum* was very abundant, so much so in comparison with previous years, as to be remarked upon by some of the residents as a new plant here. This was a mistake of course, for every year since it has been common, but not so abundant. In 1874 *Anemone Caroliniana* covered acres of ground, large patches being *purple* in color (or blue as I called it), and other large patches *white*. I met with one small patch of 25 or 30 plants which were *pink*. In '75 and '76 they were only common, and in '77, rare or very few. In '74 also *Allium* (*reticulatum?*) was abundant in patches of a few square rods, conspicuous as red or pinkish patches. Also similar but less abundant patches of a white flowered *Allium*. During the subsequent years, though common, very much less abundant. The same year there were large patches of a yellow flowered cruciferous plant, (I forget what), in bloom after the Anemones. I have seen no similar patches since, except *Nasturtium sinuatum* in damp pond-like places. In 1876 *Grindelia squarosa* covered the whole country, but in '77 I did not see 100 specimens. *Euphorbia marginata* was rather rare, and most abundant where the sod had been disturbed, or the land broken, yet in 1876, some of the distant hills were whitened by its abundance. In 1877 only as usual Where the sod is turned, for fire-guards for instance, no matter in what out of the way region on the divides, these three plants invariably appear, viz: *Euphorbia marginata*, *Solanum rostratum* and *Martynia proboscidea*. In the year following the grasshoppers, an annual, soon perishing grass, was very abundant and was called a new grass to the country. There has been little of it since. I never met with *Pyropappus grandiflorus* until in 1877, and then only two specimens, until I found quite a number (75 or so) at the edge of the village on an acre or so of light soil which had been plowed only in 1871. It is my impression that out here I have not seen *Argemone Mexicana* except on disturbed ground, always the white variety.

What is the origin of the "fairy rings" so frequent on the plains? Sometimes they are simply more or less perfect *circles* of greener grass, of a width of from 6 inches to a foot and of a diameter from 2 or 3 feet to 12 or 14 feet. I have seen some of which the principal vegetation was *Lepidium Virginicum*, but as a general thing they are only fresher looking "buffalo grass" of the plains. Rarely there are fungi, as an imperfect row of puff balls at the outer edge of the belt."

Ferns of Trinidad.—Mr. Augustus Fendler, who began his botanical work as a collector thirty years ago, when he first explored the region of Santa Fe, New Mexico, and made an admirable and well known collection, and who afterwards made still larger collections in Venezuela, is now resident in the Island of Trinidad. He proposes to collect all the species of Ferns and fern-like plants of that rich tropical island,

and to distribute them in sets. The first installment, containing complete and handsome specimens of 78 species, is just received in excellent condition. The price is $7.50 per set. Application may be made to the Curator of Harvard University Herbarium, Cambridge, Mass. The species will speedily be named by Professor Eaton, of Yale College, and a printed list furnished.—A. G.

Mr. Fendler's Trinidad Ferns are very fine specimens, carefully collected, and preserved with uncommon success. They are, perhaps without exception, in fruit; and illustrate admirably the general character of the Ferns of Tropical America. The only criticism that can be offered is that many of them are so large and fine that they cannot be brought within the dimensions of ordinary herbarium paper without some clipping, a thing which a lover of Ferns does not like to do. The sets contain several species of Tree-ferns, examples of *Polybotrya*, *Aneimia*, *Oleandra*, *Danæa*, and other tropical genera, and a good series of West-Indian *Adianta*. I am preparing a list of their names, and it will be ready for publication pretty soon.—D. C. Eaton.

Notes from the Blue Ridge, Va.—Just before reaching the summit of the Blue Ridge, "Fancy Gap Pass," the roadsides, for one or two miles, were lined with *Rhododendron* and *Kalmia*, the latter in full bloom, as magnificent a display as I have ever met. Near this point a small stream crosses the road and spreads itself over a marshy flat. In the marsh, we again found *Boykinia*, *Calopogon* and *Drosera*, also *Azalea viscosa* in full bloom. At the summit we found *Pyrularia* and *Clethra acuminata* in every direction. In the rivulets *Boykinia* and also *Trautvetteria palmata* and *Veratrum viride*, *Saxifraga erosa*, *Parnassia Caroliniana ?*, *Magnolia acuminata*, *M. Fraseri* and *M. Umbrella*, *Viola rotundifolia*, *Listera convallarioides*, Hook., *Microstylis monophyllos*, Lindl., *Amianthium muscætoxicum*, Gr., *Osmunda regalis*, *O. cinnamomea*, *Dicksonia punctilobula*. The above list may seem small, but our time was limited and our object to secure specimens of several plants. There are some others, not yet satisfactorily placed, of which you will be informed if they prove of interest.

On June 27th we left the confluence of Little and Big Reed Island. No change in the flora seemed striking, until we neared Jenning's Store, a few miles this side of Hillsville. Here, in a branch, we espied, for the first time, one of the plants we were in search of, *Boykinia aconitifolia*. Pursuing the search, we found *Calopogon pulchellus* and *Drosera rotundifolia* in the marshy grounds. Just beyond Jenning's Store a rivulet crosses the road. Here again we found *Boykinia* in abundance; also *Euonymus Americanus*, *Gillenia trifoliata* marked by more copious foliage and more distinctly colored stems than our Wythe Co., plant, *Helianthemum Canadense* and *Chrysogonum Virginicum* were found on the road sides.—Howard Shriver, *Wytheville, Va.*

Ferns of Kentucky, by John Williamson.—This book is one of the most timely publications we have received, for it is both convenient and cheap. It contains sixty full-page etchings and six wood cuts, drawn by the author. When we state that in addition to these it contains full descriptions, blank pages for notes, and articles on the structure, cultivation, fertilization, collecting and drying, and classification of ferns, it will be acknowledged by all to be a marvel of cheapness. The etchings are very superior, the subjects being beautifully handled and true to nature. An advanced notice of this work appeared in the Gazette for June, p. 54, written by Mr. Davenport, and such hearty words of commendation from so high an authority should be sufficient to recommend it to every botanist. Although entitled the "Ferns of Kentucky," it is al most a complete hand-book for the neighboring States, and with but few additions would suffice for all the States west of the mountains and east of the Mississippi. We hope the book will meet with ready sale and we can cordially recommend it to the readers of the Gazette. For price and address see advertisement on the second page of the cover.

Owing to the fact that both the Editors are absent on a Botanical trip the next number of the Gazette will be delayed two weeks.

COLUMBIA COLLEGE
HERBARIUM,
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BOTANICAL GAZETTE.

VOL. 3 SEPTEMBER, 1878. No. 9

OROBANCHE MINOR IN NEW JERSEY.—In the early part of June I collected near Haddonfield in New Jersey, about five miles from Camden, a specimen of *Orobanche minor*. This plant has been on my mind for a long while, as I had seen a few specimens that were said to have been collected in this vicinity some years ago. The addenda to the last edition of Gray's Manual mentions it, as having been found "in the vicinity of Washington, and has been met with in New Jersey; but it may not long abide." As is well known this class of plants are parasites on the roots of other plants, and this species is mentioned as being parasitic on clover. It is a native of Europe where it is one of the widest spread species, extending into Asia. The finding of a single plant was an occasion for me to rejoice, but about an hour later I detected it in great abundance, hundreds if not thousands of specimens within a space of two or more acres. The owner of the property states that this is the second year he has noticed it in the yard attached to his dwelling, but could give no reason for its presence there. The ground had not been disturbed for years; no grass seed had been recently sown, nor fertilizers applied, whereby the seed could have been introduced; it seems, therefore, very singular that it should appear in such abundance and from no ascertainable cause. The height of the specimens varied from three inches to two feet two inches, and only in this extraordinary size does it differ from the European plant. The parasitic habit was easily determined, and generally was found attached to the roots of *Trifolium pratense*, sometimes, however, on *Trifolium repens* and *Poa pratensis*, but very often it was growing independent of the foster plant entirely. Sometimes the attachment was on the main roots, often on the lateral rootlets, generally one specimen in a place, but in one instance eight specimens were growing on a single clover root. The purple appearance of the flowers was very manifest, but one robust plant attracted my attention by its yellowish color; this on examination I found to be attached to the roots of Wild Carot, *Daucus Carota*. This specimen, according to DeCandolle, is *Orobanche minor*, var., *flavescens*, at one time regarded as a distinct species, under the name of *Orobanche Carota*. One week later I collected a specimen on the deposits of ballast at Camden, N. J., growing on *Trifolium repens*; this is the first instance of a parasitic plant occurring on our ballast grounds.

At a recent meeting of the Botanical section of the Academy of Natural Sciences of Philadelphia, considerable discussion was had, as to the manner of the attachment being formed, whether the seed germinated near the surface of the ground, and sent a radicle downward until it reached a root to cling to, or whether the attachment was made while the root was near the surface, and carried into the ground in some other way. On a second visit to the locality, I collected a specimen that seemed to illustrate the case, as the clover root, at a depth of three inches below the surface of the ground, had on it an abundance of the roots of the *Orobanche*, attached, so as to resemble moniliform bulblets, or in a diminutive way, strings of onions. These were examined under the microscope and the tissues of the two plants were found to be so closely interwoven, as to render it uncertain as to the point of union. In this case it was evident that the attachment was made under ground, as the growth of the root of the clover would be from the extremity, and consequently could not carry such a substance from the surface of the ground downward.

This species (whether it is so in all I cannot say,) has an enlargement or thickening of the base of the stem, sometimes an inch in diameter, and somewhat in appearance, like the corm of the Indian Turnip, with the little fascicle of roots coming out at the side instead of at the bottom part. It is not unlikely that these may retain sufficient vitality to preserve the plant over winter, as many specimens showing no attachment to the roots of any other plant were attached in a cluster around one of these thickened bases, the upper part of the plant having long since decayed. On cutting one of them open it was found to be as firm and solid as those of a growing plant.

Withering, in his Arrangement of British plants, speaks of this species as being "a destructive weed in Surrey and Essex, highly injurious to the clover crops." Whether it may become so in this country or not, only the future can determine, but no little anxiety and even alarm was felt in the neighborhood, when it became known what the plant was. A single specimen will produce sufficient seed to stock the whole neighborhood, and unless these hardened bases should be found to retain vitality for several years, the early mowing of clover fields will prevent its increase, and probably destroy it entirely.—Isaac C. Martindale, *Camden, New Jersey.*

A list of some of the most interesting species of plants collected in the Indian Territory; by Geo. D. Butler.—[concluded from p. 68.]

Liatris elegans, Willd. Sandy woods.

Liatris punctata, Hook. Dry prairie hills and sulphate flats.

Aster paludosus, Ait. Rich prairies, uncommon.

Aster sericeus, Vent. Sandstone ridges.

Aster anomalus, Engelm. Sandy woods.

Erigeron divaricatum, Mx. Roadsides.

Erigeron tenue, T. & G. Sulphate flats; common.

Chætopappa asteroides, DC. The smallest plant of my acquaintance in this family, and the earliest in bloom. The liguiate flowers are curled back soon after opening. Sandstone hills.

Amphiachyris dracunculoides, DC. The tough, elastic stems and branches make good brooms. Yards, common.

Grindelia lanceolata, Nutt., var. *latifolia*, Engelm. Stem low and simple or sparingly branched (sulphate flats), or tall and widely branched (fields and fence rows); heads large; leaves elliptical, sessile, cuspidate, serrate.

Chrysopsis villosa, Nutt. Sulphate flats.

Heterotheca scabra, DC. Fort Smith.

Silphium scaberrimum, Ell. Low prairies.

Engelmannia pinnatifida, T. & G. Limestone.

Iva ciliata, Willd. Wet places

Iva angustifolia, Nutt. Sulphate flats.

Rudbeckia alismæfolia, T. & G. Prairies, common.

Dracopis amplexicaulis, Cass. Wet prairies.

Helianthus lenticularis, Dougl. Fields, introduced.

Helianthus rigidus, Desf. Prairies

Helianthus mollis, Lam. Prairie knolls.

Coreopsis aristosa, Michx. Low prairies.

Coreopsis lanceolata, var? Every way larger, especially the darker colored achenes. Limestone cliffs.

Coreopsis tinctoria, Nutt. Very common.

Coreopsis grandiflora, Nutt. Prairies, common.

Coreopsis discoidea, T. & G. Pools, on *Cephalanthus*. During the rainy season when the pools are well filled with water, the floating seeds lodge against the *Cephalan-*

thus, and these sprouting, their roots run down enveloping the stem of the shrub with a tangled mass, often for a distance of two feet or even more, presenting a curious sight toward the close of the dry season when the pools have dried up and the *Coreopsis* is in bloom.

Thelesperma filifolium, Gray. Limestone.

Gaillardia lanceolata, Michx. Prairie knolls.

Hymenopappus corymbosus, var. *Nuttallianus*, T. & G. Limestone.

Helenium tenuifolium, Nutt. Introduced.

Leptopoda brachypoda, T. & G. Pools, rather common.

Centaurea Americana, Nutt. Four to seven feet high in fields, in prairies with smaller heads and stems 1–2 feet high, common.

Apogon humilis, Ell. Wet places, common.

Krigia occidentalis, Nutt. Prairies.

Pyrrhopappus Carolinianus, DC. Prairies.

Lobelia appendiculata, DC. The most common Lobelia in this region. Also in Franklin county, Ark., "Near Little Rock and at Memphis" *Engelmann*. (This is the plant referred to in "Additions to the Flora of Arkansas," see BOTANICAL GAZETTE, Vol. 2, p. 104, where it was called *L. breviflora*).

Specularia perfoliata, DC. Rather common.

Specularia Ludoviciana, Torr. The most common species of prairies, woods and sulphate flats.

Specularia leptocarpa, Gray. Sulphate flats and dry hills.

Vaccinium arboreum, Michx. Rocky woods, common.

Ilex decidua, Walt. Rocky streams.

Bumelia lanuginosa, Pers. Dry woods.

Plantago pusilla, Nutt. Very common. Large specimens have toothed leaves.

Plantago heterophylla, Nutt. Sulphate flats, rare.

Plantago Patagonica, var., *gnaphalioides*, Gray. Prairie knolls.

Plantago Patagonica, var., *spinulosa*? Gray. Prairie knolls.

Plantago Patagonica, var., *aristata*, Gray. Sulphate flats.

Androsace occidentalis, Pursh. Common.

Centunculus minimus, L. Sulphate flats.

Hottonia inflata, Ell. Arkansas river.

Bignonia capreolata, L. Red river.

Catalpa bignonioides, Walt. Arkansas river.

Pentstemon gracilis, Nutt. Dry prairies.

Pentstemon laevigatus, Sol., var., *Digitalis*, Gray. Prairies.

Gerardia grandiflora, Benth. Dry woods.

Castilleia purpurea, Nutt. Perennial, stems cæspitose. Not parasitic? Limestone cliffs.

Hedeoma hispida, Pursh. Common.

Salvia azurea, Lam. Prairies.

Monarda fistulosa, L. Rich prairies and thickets.

Monarda Bradburiana, Beck. Cherokee Nation.

Monarda Russelliana, Nutt. Stem simple and erect or slightly branched and decumbent at the base, $1\frac{1}{2}$–3 feet high; leaves few, short-petioled, ovate-lanceolate, rounded at the base, serrate, dark green; whorls always terminal; bracts purple tinged, acute at each end; calyx curved; corolla white, slender, $1\frac{1}{2}$ inch long, smooth, the lower lip dotted with red purple; angles of the stem, margins of the leaves and bracts, and throat and tube of the calyx very pubescent. Corollas slowly centrifugal, so that while any one lasts but 2 or 3 days, a head will be in flower for a month or more.

There are seldom more than 6 flowers expanded at once, usually only two or three. Dry woods.

Monarda aristata, Nutt. Common on limestone.

Monarda punctata, L. Scarce.

Myosotis macrosperma, Engelm. Larger than the very common *M. verna* of which it seems to be a form, but more slender and with larger calyx and nutlets. Alluvial or damp woods, not uncommon.

Heliotropium Indicum, L. Fort Smith, introduced.

Phacelia parviflora, var., *hirsuta*, Gray, *P. hirsuta*, Michx. Thickets, rather frequent.

Phacelia strictiflora, Engelm. and Gray. Sulphate flats, common.

Hydrolea ovata, Nutt. Common in pools, beds of rocky streams in Arkansas, "In La. and Texas."

Gilia coronopifolia, Pers. Thickets and prairies.

Cuscuta inflexa, Engelm Thickets, on herbs and shrubs.

Cuscuta decora, Chois. Prairies.

Cuscuta decora, var., *indecora*, Engelm. Sulphate flats.

Cuscuta arvensis, Beyrich. Low prairies.

Cuscuta cuspidata, Engelm. Prairies.

Cuscuta glomerata, Chois. Rich prairies.

Solanum rostratum, Dunal. Introduced from the western plains.

Physalis lanceolata, var.? *hirsuta*, Engelm. Rough pubescent, erect and branching; leaves oval to oblong, large, entire. Dry soil.

Sabbatia angularis, Pursh. Prairie knolls.

Sabbatia campestris, Nutt. Very common.

Asclepias obtusifolia, Michx. Prairies.

Asclepias stenophylla, Gray. Prairies.

Acerates viridiflora, Ell. Leaves usually lance-ovate to lanceolate.

Acerates longifolia, Ell. Dry soil

Acerates auriculata, Engelm. Rare.

Asclepiodora viridis, Gray. Prairies, common.

Oxybaphus nyctagineus, Sweet. Thickets.

Oxybaphus oblongifolius, Gray. Apparently distinct. High prairies.

Oxybaphus angustifolius, Sweet. Sulphate flats.

Alternanthera Achyrantha, R. Br. Sulphate flats.

Eriogonum longifolium, Nutt. Limestone.

Rumex Engelmanni, Ledeb. Sulphate flats

Phoradendron flavescens, Nutt. Mostly on *Ulmus alata*.

Euphorbia dictyosperma, F. & M. Common.

Euphorbia heterophylla, L. Banks of streams, rare.

Euphorbia petaloidea, Engelm. Limestone.

Jatropha Texana, Mull. Caddo.

Stillingia sylvatica, L. Exclusively in prairies on knolls, not uncommon.

Tragia urticaefolia, Mx. Common.

Croton glandulosus, L. Sandy woods.

Croton capitatus, Michx. Sulphate flats

Croton Lindheimerianus Scheele (1852. Not Torrey in Bot. Bound., nor DC. Prod.; *C. entriguus*, Gray.). Old fields and roadsides, appearing as it introduced, but also occurring rarely in sulphate flats. Also on M., K. & T. R. R., about 7 miles southwest of Fort Scott, Kansas.

Croton monanthogynus, Michx. Arkansas river.

Crotonopsis linearis, Michx. Sandy woods.

Andrachne Ramevicana, Mull Limestone, "In Ark.," *Engelmann*.

Maclura aurantica, Nutt. Common.

Quercus Muhlenbergii Engelm. Limestone.

Castanea pumila, Michx. San Bois Mt and northeastward into Ark. and Mo.

Sagittaria graminea, Michx. Leaves 1–1½ inches wide.

Spiranthes vernalis, Engelm. & Gray. June and July. Much earlier than *S. gracilis?* Prairies.

Cooperia Drummondii, Herbert. Bulb 4–6 inches beneath the surface. I never found it in wet places, but on sulphate flats and dry prairie hills.

Nemastylis celestina? Nutt. Single flowered at the summit, and another *fertile(?)* flower concealed beneath a bract 3–6 inches lower down. Stem very slender. Prairies, *isolated*, uncommon.

Nemastylis acuta? Engelm. & Gray. (*N. gemmiflora?* Nutt.) 2–several flowered. Prairies, common.

Amianthium muscaetoxicum, Gray. Parts of the flower often in fours. Limestone.

Scilla Fraseri, Gray Common.

Allium mutabile, Michx. Prairies, common.

Yucca angustifolia, var., *mollis*, Engelm. Dry hills.

Commelyna angustifolia, Michx. Dry sandy woods.

Tradescantia Virginica, L. Flowers sometimes white and rarely rose colored. A form occurs with flowers about 2 inches in diameter and about 2 weeks earlier, with the wider leaves lineate with glandular dots. Common.

Cyperus vegetus, Willd.

Cyperus acularis, Torr.

Scirpus lineatus, Michx.

Fimbristylis spadicea? Vahl.

Isolepis carinata, H. & A.

Scleria hirtella, Sw.

Carex acuta? L.

Alopecurus aristulatus, Michx. Pools, common.

Aristida purpurea, Nutt. Dry prairies.

Bouteloua hirsuta, Lay. Dry hills.

Gymnopogon racemosus, Beauv. Dry woods.

Tricuspis stricta, Thurb. Low prairies, not uncommon.

Arundinaria tecta, Muhl. Found in bloom April 26th.

Lepturus paniculatus, Nutt. Dry prairies.

Hordeum pusillum, Nutt. Sulphate flats.

Elymus striatus, Willd Common.

Phalaris intermedia, Besc. Common.

Paspalum Walterianum, Schultes. Overflowed situations.

Paspalum Floridanum, var., *glabratum*. Glabrous; spikes thicker and longer; culm stouter. Prairies.

Panicum dichotomum, var , *nitidum*, Gray. Common

Panicum dichotomum, var., *scoparium*, Engelm. (*P. scoparium*, Lam.)

Setaria glauca, Beauv., var. Perennial and stoloniferous; apparently indigenous. Prairies, common.

Rottbellia cylindrica? Chapm. Prairies, common.

Tripsacum dactyloides, L. Low prairies.

Sorghum arenaceum, Chapm. Prairies.

Chcilanthes lanuginosa, Nutt. Dry sandstone.

Ophioglossum vulgatum, L. Rather common.

Isoetes melanopoda, J. Gay.

Isoetes Butleri, Engelm., n. sp. See Bot. Gaz., Vol. 3, No. 1, p. 1.

Nearly all the species mentioned in the above list were verified by Dr. Geo. Engelmann.

[As we have, perhaps thoughtlessly, admitted to our pages articles not very complimentary to Mr. J. C. Arthur, it is but simple justice that the following answer be published.—Eds.]

As Regards the Flora of Iowa.—During the last year several articles* have appeared in print derogatory to the exhibit of the Iowa flora, as shown by my pamphlet, entitled "Contributions to the flora of Iowa." It is due to myself, and to all who may have occasion to use the Catalogue, that these receive some notice.

In the Botanical Gazette for October, 1877, is "An Explanation." It says there has been made "a very unfortunate mistake for the credit of our State Flora, on the part of the authors (it is incomprehensible how I can be spoken of in the plural number) of our Catalogue, who report only 979 plants, while our whole number must be twice as many." Then follows a disparaging comparison with the 2,034 species of the Nebraska Catalogue, in which there is no mention that the latter contains 363 cryptogams, a class of plants not included in the Iowa list. The writer is then charged with gross negligence in preparing the Catalogue, etc., etc.

The facts are these: In the preparation of the Iowa Catalogue no efforts were spared to make it as complete as possible. A tour of the State was made in order to

*See Bot. Gaz. vol. 2, pp. 73, 107, 114 and 143; also Bull. Torr. Bot. Cl., March. 1878.

secure a personal consultation with every botanist and an examination of each herbarium then known to the writer. Moreover every precaution was taken to prevent mistakes in the determination. When the evidence of authenticity was not satisfactory, the locality was given in a foot-note, so as to hold the person reporting it responsible. Mere lists without the specimens received but little attention. Such a strict surveillance naturally excluded many names which might otherwise have been used. The object was to make a list of plants *known* to be growing in the State, and to exclude all others however *probable* it might seem that they were natives. Such has also been the aim in making the additions (published in the Proc. Dav. Acad. Nat. Sci.) to the Catalogue. In these addenda names have been expunged, changed, or added, as required by later information. Printed copies are distributed to all Iowa botanists and to such others as desire them.

As regards the method of publishing additions to the State flora, I cannot think that the indiscriminate and irresponsible use of the columns of botanical periodicals (better filled with other matter) for local floras, is at all conducive to accuracy. To make a short and clear proof of this statement, I have tabulated all the additions to the Iowa flora one person has published in this manner; and as this is done through no ill will, but with the best of intentions, all doubts in the discrimination have been resolved in his favor:

	Bot. Gaz. Jan. '77.	Bot. Gaz. June '77.	Bot. Gaz. Oct. '77.	Torr. Bull. Mar. '78.	Total.	Per cent.
Correct and subsequently published..	8	4	0	12	24	28
Correct but already published.....	3	0	0	21	24	28
Doubtfully determined.....	6	2	1	2	11	13
Incorrectly determined.....	5	5	4	4	18	21
Without the scope of the Catalogue..	5	1	1	1	8	10
Total.....	27	12	6	40	85	100

This shows that only 28 per cent. were *bona fide* additions, that an equal number should not have been published, over a fifth were incorrectly named, and 10 per cent. were of plants with which the Catalogue has nothing to do. Truthful information is earnestly desired, but such as the above table shows to have been published is misleading and worse than none.—J. C. Arthur, *Agricultural College, Ames, Iowa.*

× MONOTROPA UNIFLORA.—We read with much pleasure and profit Dr. Kunze's notes upon *Monotropa uniflora*, and we are glad that our former note called them out. While acknowledging that the weight of the Doctor's practical experience militates strongly against our previous statement, we still think the evidence in the case warranted us in making a pretty strong statement of probable poisoning. Since some grave doubts have been thrown upon the correctness of our attributing the toxic influences mentioned to *Monotropa uniflora*, we have again investigated the case and have evidence that seems rather to strengthen our former statement. This matter we give to the readers of the GAZETTE for their own conclusions.

The young lady, concerned, did not gather the plant in the woods, and hence could not have been poisoned by coming in contact with *Rhus* in that way. She re-affirms her belief that she was poisoned by the Indian Pipe, as she was handling this plant when she crushed it with the results before mentioned. The examination took place at her home after the plant had been brought from the woods. Of course it is barely possible that there might have been some roots of *Rhus* about it when she was handling it; although the particular specimens, which are in my Herbarium, show no indications of any matters belonging to another plant, nor do I remember to have seen any when the plants were first given to me. The young lady says she has often handled the *Rhus Toxicodendron* without any bad effects; but this having been done even several times might not be conclusive evidence at all, that under other states of the constitution this subtile poison would not reach her.

Of course with the experience of Dr. Kunze and others made known to me, I recognize that the cumulative evidence bears strongly against the isolated case we have presented. But I have given the facts just as they were given to me, without knowing that the plant had any particular value in therapeutics. If it is not a genuine case of poisoning by this plant, the evidence, all things considered, is very strong that way.—A. H. YOUNG, *Lafayette, Ind.*

BRYUM ATWATERIÆ.—The discoverer of this plant was, as Elizabeth Emmerson of Vermont, a pupil at the Way Seminary in 1828, when the writer (then Mrs. Lincoln) was preparing for publication her lectures on Botany. Some forty years after this, the former pupil visited the writer at her home in Baltimore, introducing her husband, S. T. Atwater, Esq., of Chicago. She had cultivated the love of science imbibed from her school teachings. In affluent circumstances, without children, and with an indulgent husband who was happy to gratify her literary and scientific taste, she had traveled much and made extensive researches in Natural Science.

After the renewal of our acquaintance she was a faithful and attentive correspondent. At my suggestion she presented to the "Maryland Academy of Sciences" a valuable collection of four hundred botanical specimens. She was elected an honorary member of this society, which after her death at Buffalo, N. Y., in April, 1878, paid a fitting tribute to her memory, as an earnest laborer in the cause of science.

We take from a Michigan paper an extract from an address of Prof. Albert D. Hager, before the Chicago Historical Society:

"Mrs. Atwater was interested in several departments of science, but Botany was her favorite study. During a sojourn in California she preserved more than 2,000 specimens of plants, several of which were new to science." After recounting her valuable historical records, her philanthropic efforts and her active and generous benevolence, the Professor closes by this remark, "It may, in truth, be said that the world is made the better as well as the wiser for her having lived in it."

The following extract from a letter of Feb. 12th, 1878, to the writer, gives the history of the discovery and naming of the *Bryum Atwaterie*:

"I forward for your acceptance this little specimen. I believe you will feel an es-

pecial interest in it, from its having been found by your former pupil. I gathered it with other plants, at the foot of the Yosemite Falls, in the Yosemite Valley, Cal., on June, 24th, 1873. It being an infertile specimen, I hesitated relative to pressing it, but was attracted by its peculiarity and preserved several tufts of it. Attaching no particular value to it—being not in fruit—yet greatly interested in its appearance, I did not send it with other plants, to friends for whom in my travels I am in the habit of collecting, but chanced to include one in a small parcel to my friend, Dr. Chas. Mohr, a German gentleman, resident in Mobile, Ala., and a fine botanist. He noticed it as new to himself and immediately forwarded the tuft to *Dr. Karl Muller*, the distinguished Bryologist in Germany. I quote from Dr. Mohr's letter in reference to it: 'Dr. Muller describes that fine brown moss, of which you had sent me an infertile specimen, as a new species, naming it in honor of its enthusiastic discoverer, *Bryum Atwaterix*. It is nearly allied to the *B. alpinum* of Europe.' It was reported in the 'Bulletin of the Torrey Botanical Club,' New York, August, 1874."

To this account of the discovery and naming of the plant under consideration, we will add that though the name of the genus *Bryum* is ascribed to Linnæus, it seems to have been merged in with other genera of Mosses, and is not found in the works of many of our distinguished American Botanists. Lindley refers to Hooker for a description of the family *Bryaceæ*, of which *Bryum* may be considered a type. He enumerates more than a hundred genera of *Bryaceæ*, and says: "The little plants, the *Urn Mosses*, form one of the most interesting departments of Cryptogamous Botany; they are distinctly separated from all the previous tribes by the peculiar structure of their reproductive organs." The position of the *Bryaceæ*, according to Lindley, is between *Jungermanniaceæ* and *Andræaceæ*. We have not seen what the distinguished Bryologist, Karl Muller, says of this peculiar family of plants. That he has honored our countrywoman in naming her as a discoverer, entitles him to our gratitude.

I will add to this article but one short sentence, worth more than all to her who is now in the better world—she was a Christian.—Almira Lincoln Phelps, *Baltimore, Maryland.*

The Native Flowers and Ferns of the United States; by Thomas Meehan; Illustrated by Chromolithographs, Boston, L. Prang & Co.—We have received five parts of the first volume of this handsome publication. It is a charming work and well calculated to arouse an interest in the study of botany among those who have considered it too dry and technical. The colored plates are beautiful and the descriptions and histories given in the accompanying text are written in such a popular way as to interest and instruct even those who have no knowledge of botany. No special order is followed, but plants are selected representing as great a range of country as possible, so that even in one part the reader is carried over considerable of the territory of the United States. In his selection of plants, too, Mr. Meehan, shows that he is a true botanist, for he sees beauty in plants that would escape the ordinary observer, and deems them worthy of a place and plate. The price too (50 cents a part) puts the work within every ones reach. To show something of its nature the following list of contents of the first parts is given. It must be remembered that every species in the list also represents a colored plate.

Part I.—*Tradescantia Virginica, Geum triflorum, Gelsemium sempervirens, Polypodium incanum.* Part II.—*Viola cucullata, Anemone nemorosa, Aquilegia chrysantha, Pachysandra procumbens.* Part III.—*Helonias bullata, Carex stricta, Cuphea viscosissima, Thalictrum dioicum.* Part IV.—*Anemone patens*, var. *Nuttalliana, Orchis spectabilis, Symplocarpus fœtidus, Pedicularis Canadensis.* Part V.—*Erythronium Americanum, Phlox subulata, Saxifraga Virginiensis, Arctostaphylos Uva-ursi.*

Errata.—In No. 8, Vol. 3, p. 67, 4th line from top, for "pubescent" read "procumbent." l. c. 26th line, read "*uncinata*" for "*runcinata*."

BOTANICAL GAZETTE.

VOL. 3 OCTOBER, 1878. No. 10

SOME WESTERN PLANTS.—Western plants now and then turn up at the East, other than those which have been introduced by railroad, cattle-transportation, and with grass-seed. Mr. Hitchings, of Boston, a very sharp-eyed observer, has recently brought me, from the borders of a pond in Winchester near here, the three following plants, growing together:

Echinodorus parvulus, Engelm., a re-discovery, having been found near here by Thos. P. James, ten years ago.

Scirpus supinus, var., *Hallii*, Gray, thus far without the curious subradical flowers which were found by Mr. Morong at a neighboring locality

Eleocharis Engelmanni, Steud., var. *detonsa*, Gray, enumerated in Patterson's Catalogue of Oquawka Plants, and found also by E. J. Hill, in Indiana. The form of the species with bristles as long as the nut was collected in Connecticut, at Wethersfield, by Charles Wright. The species is nearest *E. obtusa*.—A. GRAY.

NELUMBIUM LUTEUM.—Mr. J. R. Lowrie of Warriorsmark, Penn., sends us the following extract from a letter from Prof. Thos. C. Porter in which was described a recent botanical jaunt into New Jersey:

"Some weeks ago, leaves and flowers of *Nelumbium luteum* reached Dr. Trail Green from a lake in Sussex Co., N. J., and as neither of us had ever seen this giant lily in its native haunts, we resolved to go in search of it Last Monday (Sept. 2) at 7 A. M., we started on the Morris and Essex R. R. and were in Newton, the county town of Sussex, by 9 A. M. Thence by carriage over hills we travelled six miles westward to a beautiful little lake, called Smartswood Pond, lying in the valley of the Paulin's Killereek, about five miles east of the Blue Ridge. Its length is about three miles and its greatest width one; but its outline is irregular. The day was warm, but tempered by a fine breeze. No time was lost in hiring a boat and a man to row it. Off we pushed and directed our course to the largest of the three patches of Nelumbo found in the lake. It occupies a sheltered, curving bay on the north, and is perhaps a dozen acres in extent, and is discernible to the practiced eye afar off, because many of the big, pelt late leaves, as large and round as young Norval's father's shield, and elevated on stout petioles about two and a half feet above the surface of the water, and amongst them, here and there, appeared peduncles as long and stout bearing the curious top-shaped receptacles with their embedded seeds nearly ripe. These tossed by the breeze presented a novel and charming spectacle, as we drew near and glided through them. It brought to mind Longfellow's description of the lakes of the Atchafalaya when traversed by Evangeline:

——"resplendent in beauty the LOTUS
Lifted her golden crown above the heads of the boatmen,"

which from my observation I suspect to be a practical exaggeration. Other leaves, of all sizes, float, and the drops of water dashed upon them by the dip of the oar, or the inflowing waves, rolled and shifted with a silvery luster like drops of quicksilver. The same repellant power you may have noticed in those of another plant, the golden club, *Orontium aquaticum*, which is not strictly a coast plant, since it is not uncommon in swamps as far west as the summit of the Alleghanies.

Open spaces amongst the Nelumbium were covered with the floating leaves of *Nymphæa odorata*, and an occasional flower of *Nuphar advena* and of *Brasenia peltata* in fruit. Along the shore near by, stood up ranks of *Pontederia cordata* with its spikes of lovely blue. Scanning narrowly the leaf-carpet on the water, as we slowly passed across, two plants, new to New Jersey and not known to grow so far to the south-east, revealed themselves, peeping just far enough above the water to expand their flower buds into bloom, *Nasturtium lacustre* and *Bidens Beckii*. I need hardly tell you that these treasures were booked. Nearly the whole coast line is rocky and abrupt. Only at one point is there a low marsh of considerable extent, overflowed at times, and covered with bushes and tussocks of grasses and carices, with black mud between. Not a trace of *Sphagnum* was discovered. Here grew *Ranunculus multifidus*, *Mikania scandens*, *Nesæa verticillata*, *Rumex Britannicus* and *Carex comosa*. Around the shelving margin of a rocky promontory, where an abundance of *Scirpus validus* lined the water's edge, we struck upon dense masses of *Eleocharis quadrangulata*, its square culms, rising from the shallows two feet above the surface, tipped with yellow spikes, suggesting an ancient army with its forest of spears. This was an excellent find. There too were gathered *Cladium mariscoides* and *Eriocaulon septangulare*. Two Potamogetons are very plentiful and beautiful to look down upon as they flourish in the pure, clear water, *Potamogeton Robbinsii*, fern like in appearance, and *P. amplifolius* with its broad, curled leaves. No sign of flower or fruit could be found on either. Other plants noted by us are *Hieracium Canadense*, *Taxus baccata*, var. *Canadensis*, *Saururus cernuus* and *Peltandra Virginica*. Of course the few brief hours of one summer day, and the hurried exploration of a few spots could not assure us that we had seen all that was worth seeing in, upon and around the charming Smartswood Lake. About the middle of the afternoon we turned our faces towards home and reached Easton at 7 P. M., well satisfied with our floral gains, with the enjoyment of travel and scenery and glad to have discovered another place worth visiting for plants or pleasure within easy reach."

Ferns in South Florida.—As in colder so in this warmer climate ferns luxuriate best in moist, shady places, but instead of the secluded nooks and sloping banks of musical rivulets we meet them generally in low rich hummocks of dense woody growth, and where if water is seen, appears in still, placid ponds or quiet, slow, snail-like moving streams. With the exception of *Aneimia adiantifolia*, Swz., *Pteris longifolia*, L., and *Ophioglossum bulbosum*, Michx., and *O. nudicaule*, all others attain the greatest perfection in these vegetable jungles.

Acrostichum aureum, L., the tallest of Southern ferns is invariably associated with brackish water. It is of common occurrence on the borders of marshes, bayous, creeks and rivers to the head of tide water. Although frequent along the mainland from Tampa and Biscayne bays south, is rarely seen on the keys. To a passing observation there seemed little or no disposition to sport or variation. It is quite difficult to dry, parting with its moisture reluctantly and readily imbibing again upon exposure to a humid atmosphere, a character possibly due to a deposition of chlorides in its cellular structure like other saline plants. Sometimes on boggy flats subject to daily inundations of the tide, there appears a series of low hillocks closely grouped, on each of which grow about 3-12 stalks of 6-8 fronds each. The loose soil of the interspaces having been washed out by the recessions of the tide. These hillocks are a mass of rhizomes of this fern which vary in size from one or two to six inches in length and two inches in width, with numerous lateral spongy roots a foot in length with the thickness of a goose-quill. There appears in these rhizomes one or several buds of an adventitious character, which develop into lateral stalks whose rhizomes ultimately separate from the parent one.

Polypodium Plumula, H. B. K. First detected by Dr. Leavenworth at Tampa, more recently by Miss Dickens at New Smerna, and now at Manatee. In this locality it is

restricted to a small area of high banks of a stream in a hummock draining a series of ponds. The soil is mostly clay intermixed with a small per cent. of sand and vegetable matter. On the sides of the high banks and near the water's edge, apparently in pure clay and rocks, the fronds are narrower, more rigid and erect while upon the banks and a little distance from the water, they are wider, more flaccid and generally reclining. All fronds appeared fertile and measured 2–4 inches in width and ½–3 feet in length. In drying a novel character was developed in the flexible nature of the stripe suddenly curving in removing pressure, as though there was an inequality of tension of the elastic tissue in the cellular structure.

Polypodium incanum, Swz. Common and general, but rarely seen on other than the live oak. This fern shows a sensitive character in the abstraction of moisture in curling of the fronds and which instantly unfurled in a heavy dew or rain.

Polypodium Phyllitidis, L., is confined to low, humid and densely shaded hummocks. It was observed in several localities in Dade and sparingly in Manatee counties. It is a handsome fern 2–3 feet in height. The stalks occur sporadically, each sending up 6–12 rigidly erect fronds of a yellowish green color due to their translucent character and which is in part or wholly lost in drying. Very commonly the stalks are lodged in the decaying trunks of prostrate trees or old stumps near the ground, sometimes on the ground where the soil chiefly consists of decomposing woody or vegetable matter.

Polypodium aureum, L., is common and general on the main-land but rare on the Keys. It is always associated with the Cabbage Palmetto, growing from its stem, usually above reach and just beneath the spreading palm leaves which contribute constant shade and moisture. The novel lattice work of remaining dead petioles covering the trunk of this tree, offers a favorable and secure lodgement for the large creeping root stalks of this fern. The glaucus fronds appear pendent, spreading or erect according to their length, which varies from ½–3 feet. The fruit dots occur in single rows in the smaller and double in the larger fronds, but very commonly there appear breaks in the lines of fruit dots where the sporangia failed to develop.

Vittaria lineata, Swartz. A frequent companion of the preceding and like it restricted to the same tree. The pendent linear fronds appear in large tufts, lodged anywhere on the trunks. The fronds are commonly 1–2 feet long, but occasionally attain a length of 3 feet.

Pteris longifolia, L., inhabits the rocky ledges in the open pine barrens at Miami, and is firmly rooted in the crevices of the rocks. The fronds, a few to many in a tuft, are usually erect, 1½–2 feet high and of narrower pinnæ than the same in cultivation. It seemed rather limited in its range and was not noticed elsewhere.

Pteris aquilina, L., is extremely common, appearing alike in pine barrens and fertile hummocks, but in the former is more dwarfed, 1–2 feet high; while in the latter, growing in rich vegetable mould, often attains a height of 5–6 feet with a black glossy stipe suitably large for a light walking cane.

Blechnum serrulatum, Michx., is not uncommon south of 28 N. Lat., and quite abundant where it grows. It inhabits boggy grounds along bayous, rich hummocks or adjacent pine lands, and appears in patches with the stalks of several fronds often regularly ½–1 foot apart. These stalks have a simple or forking underground root-stem, ½ inch in diameter and ½–1 foot long, which give origin to one or several new stalks annually, and apparently is the chief mode of propagation. The sterile and fertile fronds are equally common, but the former are wider and taller. The prevailing dimensions of the fronds are 2–3 feet in height, 3–5 inches in width, but in drier soil appears more dwarfed, while in very fertile and damp soil I have met the sterile fronds, exceptionally, 5 feet high and 1 foot wide.

Woodwardia Virginica, Smith, is not uncommon in newly broken hummock grounds. It seems the same in general character as in the Northern States.

Woodwardia angustifolia, Smith, seems rare, and was observed sparingly at Manatee. The fertile fronds were not seen.

Asplenium dentatum, L., was detected in a rocky hummock at Miami. Like the other small species of the genus it grows out of the crevices of lime rocks, and sometimes by the close grouping of the little tufts, covers the entire face of shaded rocks but instead of being found upon the sides of rocky ledges like the northern species, it is restricted to rocky sides of depressions or rock holes, lower than the surrounding surface. These depressions, or rock holes, are common in this part of the State, and furnish constant shade and moisture and suitable protection against the hot rays of the sun. It is circumscribed in its range and was seen in this locality only.

Asplenium ebeneum, Aiton, so common north, is rare in this latitude. It was seen sparingly in rocky places of hummocks in the counties of Levy and Manatee, but not further south.

Asplenium serratum, L. A handsome fern and worthy of cultivation. It was detected in a dense hummock near Miami, growing with *Polypodium Phyllitidis*, L., and like it the stalks of 6–20 fronds each appearing sporadically, but the fronds were dark green, flaccid and reclining so that the distant ends rested upon the ground. The stalks were not numerous and grew in rich decomposing vegetable matter filling the interspaces of broken rocks. The hepatics, mosses, other ferns, tree orchids and air plants appeared exceedingly abundant and luxuriant in this humid jungle of vegetable growth. The wild character, the difficulty of penetration, and the molesting mosquitos deterred me from making thorough search through the entire hummock. The fern was not seen elsewhere.

Aspidium Thelypteris, Swz. Quite common in marshy places of pine barren ponds and hummocks.

Aspidium patens, Swz. Very common and general; sterile and fertile fronds equally abundant.

Aspidium unitum, R. Br., var. *glabrum*, Mettenius, occurred in boggy places along the upper Miami river, and similar localities at Manatee, but not in great abundance.

Aspidium cristatum, Swz., var. *Floridanum*, (H. K.) appeared in great abundance in low wet places in the Gulf hummock in Levy county, also in a similar hummock near Manatee. The latter locality likely marks its southern range, for south, the northern plants invariably associated with it disappeared, such as *Quercus rubra*, *Carya tomentosa*, *Acer rubra*, *Ostrya*, *Carpinus*, *Ulmus Americana*, and many common northern mosses. The sterile fronds were smaller than the fertile.

Nephrolepis exaltata, Schott. Just where the last seems to terminate in its southern range this fern makes its appearance and seeks similar retreats, in low, rich hummocks covered with dense woody growth. The fronds are narrow and from 2–6 feet long. The stalks appear in rather large patches, growing in decomposing vegetable matter or soil composed principally of the same. Exceptionally it grows on the trunks of the Cabbage Palmetto. Generally the long fronds are old and imperfect having dropped their terminal pinnæ. The shorter fronds are erect, but the longer are reclining and sometimes pendent when on the trees. In drying there is frequently a disposition of the pinnæ to separate from the stipe. It appeared rather common in Dade county, but more sparingly in Manatee.

Anemia adiantifolia, Swz. A handsome fern and apparently restricted in its range. It grows on the low rocky surface or the shaded sides of rocky ledges, always in the open pine barrens. I have not seen it away from the Miami country. In company with *Pteris longifolia*, L., and like it is firmly lodged in the crevices of the rocks.

The sterile fronds are common perhaps the entire year, but the fertile make their appearance only after midsummer.

Osmunda is well represented by the three northern species. I don't know that they differ in characters or habits from the same further north, except that they fruit very sparingly and imperfectly. The sterile fronds are always abundant and luxuriant. December last, when all vegetation here had stopped growing, I observed a number of fronds of *O. cinnamomea*, L., with the lower pinnæ fertile and the upper sterile. The following spring examined a number of stalks, but found all sterile except one or two, in which the upper pinnæ were disposed to become fertile.

Botrychium ternatum, Swz., var. *obliquum*, Milde., is rare in this latitude. Saw a few stalks of it in the Gulf hummock.

Ophioglossum bulbosum, Michx., was detected in March growing in old fields of a hummock at Manatee. Stem 2–3 inches high with the part below the leaf imbedded in the damp, compact, sandy soil. There appeared from 1–3 fronds to each bulb; one in which sporangia had not yet developed, the second with matured fruit, and when a third was present it generally appeared decaying. I frequented the same locality a month later, but failed to detect even a trace of it, so that its fruiting period is likely of short duration. Several years since I saw the same in fruit at Palatka in the latter part of February.

Ophioglossum nudicaule, L., was seen in good fruiting state and rather plentiful in the month of November. It grew in damp compact sandy soil on the borders of pine barren ponds in Levy county. It was 1–2 inches high, and like the preceding sends up 1–3 stems to each thick root, with the parts of the stems below the leaves imbedded in the soil. It is apparently probable that the thick root in this and the bulb in the preceding are perennial. Likely both species are not uncommon, but are readily overlooked on account of their small size and growing with other small plants.—Dr. A. P. Garber.

How Shall we Pronounce Botanical Names?—In view of the fact that the pronunciation of Latin and Greek is undergoing certain well known changes, in accordance with the results of recent investigations, a question of a good deal of importance to botanists who are teachers in colleges where they are obliged to deliver lectures, is that which deals with the pronunciation of botanical names. I need not say anything as to the advisability or inadvisability of our classical teachers adopting the new or "phonetic" pronunciation; that is a matter for others to discuss and quarrel over; I may be permitted, however, to say that I have no doubt whatever that in a few years all our students will be pronouncing Latin and Greek in accordance with this method. Taking this for granted, what shall we do with our botanical names? Shall we harden every *c*, *g*, and *qu*? Shall every long *a* be *ah*; every long *e* be *a*; every long *i* be *e*; every long *u* be *oo*? For hundreds of names there will be no difficulty, and the change will be scarcely noticeable, but in a great many other cases the new pronunciation will be startlingly different from the old. Witness the following examples: *Aquilegia* (Ah-kil-a-ge-ah, pronounced with g hard), *Geranium* (Ga-rah-ne-um, with g hard again), *Acer* (Ah-ker), *Circæa* (Kir-ka-ah), *Cephalanthus* (Keph.), *Vaccinium* (Vak-kin.), *Rosaceæ* (Ro-sah-ka-a), *Ericaceæ* (Er-i-kah-ka-a), *Cyperaceæ* (Kip-er-ah-ka-a). I can not exactly represent the sounds without marked letters, and so have been obliged to occasionally use a consonant in a wrong syllable in order to indicate the vowel sound. At first these names thus pronounced, repel one from the new pronunciation, but after a little, when the ear has become accustomed to the new sounds, I must confess to liking them. There are some points connected with names derived in a barbaric way from the names of persons and places, of which I will have something to say hereafter.—C. E. Bessey, *Iowa Agricultural College.*

MEDICINAL PLANTS IN CALIFORNIA.—*Grindelia robusta*, which grows throughout the State supplies a balsam of a resinous character, most abundant in the buds, but found in all the juices of the plant. As a cure for the eruption occasioned by contact with the "poison oak," the balsam is accounted almost a specific. It is also in demand in the Atlantic States as a remedy for asthma and bronchial affections.

The leaves of the *Eucalyptus*, serving as the stuffing of a pillow, have been found beneficial in relieving neuralgic headaches; and a tincture prepared from the leaves has a variety of uses in medicine.

One of the newest of vegetable drugs is obtained from the *Yerba santa*, a shrub known also as gum-weed, mountain balsam, wild peach, and bears' weed. The leaves contain a resinous substance highly spoken of as an ingredient in cough mixtures, and for the cure of bronchial and laryngeal disorders.

The collection and drying of medicinal plants in California, for shipment to manufacturing chemists at the East, is gradually becoming a business of importance.—[N. Y. TRIBUNE.]

ANEMONE CAROLINIANA.—I have two specimens of *Anemone Caroliniana*, Walt., collected April 23d, 1878, with rudimentary flowers, consisting of a single sepal of the usual size and color in one plant, and situated about $\frac{1}{2}$ inch below the ordinary terminal flowers. The other plant has a single sepal about twice the length of the ordinary ones, purple, with greenish margins, situated in the axil of the three-parted involucre. Both sepals seemed to have a strong inclination to twine, or wrap around the stem from left to right. These two plants were found about half a mile apart on a R. R. grade.—M. H. PANTON, *Junction City, Kan.*

HETEROMORPHISM IN PLANTAGO CORDATA, LAM.—While examining several plants of this species, I noticed that several spikes on each plant did not show the usual proterogynous condition, also that the stamens seemed longer than usual. A closer examination showed that the flowers were perfect, but the styles were only two mm. in length. The styles in the spikes which were of the common form, were six mm. in length. The stamens in the short-styled flowers were nine mm. in length, while those of the long-styled flowers were only six mm. in length. The earlier flowering spikes of each plant were of the short styled form, while the later flowering spikes were all long styled. If this species was entomophilous we could see some advantage to be derived from this mixed condition of things. It is possible this may be a case of a monœcious condition or a dicœcious condition about to be, in fact, in the very process of becoming.—C. F. WHEELER, *Hubbardston, Mich.*

MISCELLANEOUS NOTES.—During the summer of 1876 I was in Readsboro, Vt., and found *Eupatorium ageratoides* growing 4 to 5 feet high, with leaves 4 to 7 inches long and correspondingly wide. Going back to Williamstown, Mass., 20 miles to the southwest, I found every specimen 2 or $2\frac{1}{2}$ feet high or less, with leaves only 2 or 3 inches in length.

Can any one tell me how to distinguish *Aster Tradescanti*, L., from *A. miser*, L., Ait? I have never found anything that I could conscientiously call *A. Tradescanti*, although others have given that name to some specimens that I called *A. miser*. Prof. Peck, of Albany, told me that he also had never found what he could call *A. Tradescanti*.

Gray's Manual describes *Solidago altissima*, L., as "2 to 7 inches high—instead of the tallest, as its name denotes, it is usually one of the lowest of the common Golden rods." I think I have never found it less than 2 feet high under any circumstances, seldom less than 4 feet.—CHAS. H. FORD, *Geneseo, Ill.*

While peeling the bark from a freshly cut black locust post, I noticed that the cambium layer smelled precisely like bruised green beans. The scent was recognized by several others without my telling them what I had observed. I have not yet tested further whether this novel way of tracing the affinity of plants may be made useful or not.—J. M. Milligan, *Jacksonville, Ill.*

When in Crawfordsville, Ind., a few weeks ago, I was pleased to find in the grounds of Prof. Wm. C. White, some beautiful plants of *Euphorbia dentata*. They had neither been planted there nor escaped from elsewhere, but evidently were relics of the old times when the forest in all that region was unbroken.—J. M. C.

Juniperus occidentalis in Colorado.—Since my arrival at this Agency, my attention has been drawn to the Juniper which, mixed with *Pinus edulis*, covers the mesas and foot hills throughout this part of S. W. Colorado. Its botanical character seemed to be so distinct from *J. Virginiana*, that I at once thought it to be *J. occidentalis*, with the description of which, in Clarence King's Report on the Botany of the 40th parallel, it seems to agree perfectly. But he says "not reported from Colorado." Neither is it spoken of in Hayden's Synopsis of the Colorado Flora, 1874. The exploring parties since then may have discovered and published its occurrence here. The tree rarely becomes conical like *J. Virginiana*, the fruit always glaucous, and two or three times as large as the fruit of that species. Heart wood usually brown, rarely red. Height 12–20 feet. Branches wide spread.—William F. Flint, *Los Pinos, Indian Agency, Colorado.*

The Big Trees, by J. G. Lemmon.—In 1875, I took a trip of 400 miles to revisit the Big Trees, count their rings and bring away sprays, cones, seeds, bark and wood sections for the Centennial. I visited several groves, closely examined hundreds of trees, especially giving attention to the fallen and shattered monsters, generally larger than living trees of the same grove.

The great *Sequoias* are monsters indeed for size and magnificent in their columnar appearance; they are well worthy a trip across the continent to behold, but why exaggerate their age? The truth is strange enough. "Over-statement," Dr. Gray mildly puts it. It is, indeed, a wonderful deviation from the truth when to large figures we add double their sum. From this time forward I must help fight the "over-statement." The battle will be long and fierce, no doubt, for the story of 3,000 or 4,000 years is very proudly related and never fails to excite interest; and it is repeated in nearly every guide book for tourists, moreover reiterated by eminent travelers and close observers, including John Muir, than whom none gives us such charming views of mountain scenery, such picturesque forest studies. But let the truth always be told, searching for it, if need be, under the most deceptive appearances. I scold myself daily because, for want of time, I took the figures of reputed authorities and gave currency to the big story of the Big Trees. Let me retract so much of last year's "Scene 11, The Big Trees," as was carelessly based upon their reported great age of 3,000 or 4,000 years, and substitute the following cold facts and estimates. I substitute the true figures cheerfully, gladly, triumphantly. The big trees are but 1,200 to 1,500 years old, and I am glad they are not older. There is proud satisfaction in the thought, but let me repress my joy and its reason for the present and proceed with the cool facts.

On the 1st of September, 1875, I arrived at the famous Mammoth Grove of Big Trees in Calaveras county, and at once commenced careful observations.

First, a quiet, reverential walk among the tall fluted columns, my spirit dumb with wonder, my mind raised to sublime conceptions, my reason almost persuaded that any large story of the great *Sequoias* must be true. Round and round, in and out among the vast trunks the well-worn path leads. Here and there a long flight of steps enables the visitor to reach the upper side of the fallen trunks, where a most impressive view

and delightful promenade may be enjoyed. Marble slabs imbedded in the soft bark, high up on each tree, bear its name and generally the initials of the namer. Near the road, almost the first to greet the visitor approaching from the north, stands a group of noble trees bearing the names of Henry W. Longfellow, Prof. John Dana, Dr. John Torrey and Prof. Asa Gray. During this first half-day of silent gazing, I found myself frequently returning to this group of scientists with a sublime poet added, and trying to commune with the master spirits they commemorate. During my last call a cone from the lofty crown of "Prof. Asa Gray" fell at my feet; eagerly I seized it and wrapped it in paper; another and another followed. The squirrels were harvesting, so the seed must be ripe. I drew my army revolver and fired a round of six cartridges up into the crown, rewarded by the fall of a limb bearing a dozen cones. As I bore away the beautiful little cones with their tiny, parsnip-like seeds, I thought how much this precious fruit symbolizes those richer fruits which that other Professor Gray showers upon all who but ask his bounty. Hard at work in the great herbarium at the Cambridge University, he is devoting, perhaps, the last herculean energies of a life filled with toil to the completion of our California Botany. Receiving no salary while on this extra work, and hiring assistants in special fields, he toils almost incessantly, ever the master mind to direct research, ever the umpire to decide knotty points, yet ever the kind patron, ready to turn aside, examine the plants of the young collector and help the humblest applicant for knowledge.

Then the good doctor's tenacity for truth is so strong! No big stories for him, no flights of fancy, no careless writing! I think of this with bated breadth, compressed lips, clenched hands and firm tread as I prepare for work in earnest on the morrow.

The stump of the very large tree which was bored off with pump augers in 1852 to form the floor of a house, affords a fine opportunity for counting, since it is so evenly smoothed off, but still more time is necessary to do it accurately than most observers allow themselves. This tree should certainly be considered a fair sample of the oldest of the present generation, for it is one of the largest ever seen. Its circuit at base is 97 feet by my tape line, held at one end by a Puritan and master builder from Boston. Longest diameter without bark, five feet above the base, 24 feet 10 inches. Shortest diameter, 22 feet eight inches. The bark averages 18 inches in thickness, making the entire longest diameter of the tree at five feet above base, over 27 feet. A few other trees are met with measuring as much or more at base, but they are generally swollen outward and hollow like the shaft of a light house. This monster tree was as straight and sound as a candle, hence it was undoubtedly the largest perfect tree ever yet seen.

I spent nearly a day counting the rings of this stump, and of the butt cut of the tree lying near it. I counted carefully both ways, putting in pins to mark the place of hundreds. The stump being a little irregular in consequence of its near roots, I counted in three places along three equidistant rays. The first count was 1,260 rings, the second count was 1,258 rings and the third count was 1,261 rings—average age, 1,260 years. Counting on the butt, cut 24 feet from the base, the rings were of course a few less, 1,242 in number, but all very plainly discernible, and presenting exact uniformity in their decrease in thickness, from heart to bark. I availed of this uniformity of decrease by establishing, after many counts of different trees, a rule for determining the mean number of rings to the linear foot, and fixing the locality on a cut across these trees where the rings are of average thickness. That point is just one third of the distance from the bark to the heart. At the heart the grains are often three-eighths of an inch thick, at the bark as thin as paper. The average, as determined by countings of all the logs in the grove which have been cut across, some half dozen or more, clearly established the rule that the rings of average width are found one-third of the way from the bark to the heart. This rule proved very useful afterward in estimating age of broken trunks.

Hercules.—This monster tree was leveled to the earth by a gale in 1862. His body has been repeatedly cut across by an ingenious device, and the timber manufactured into relics and carried away. He was 285 feet high, and now measures 14 feet in diameter 25 feet from his roots. A careful count of his rings showed only 1,232 years. Eighty-eight of these rings, the average number to the half foot, just covered the space of half a foot at the distance of two and one-third feet from the bark, which is one-third the way to the heart, as seen above. This tree is often reported as over 3,000 years old.

(To be continued.)

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FENDLER'S FERNS OF TRINIDAD.—Mr. August Fendler, the veteran collector, as has been seen from a letter of his published in the GAZETTE for July, has been for a year or two in Trinidad, where he is making a very full and fine collection of Ferns. Sets of about 78 species have been received, and are now for sale at the Herbarium of Harvard University. The specimens are ample, and are very carefully prepared. The following is a list of the species now distributed. The omitted numbers will be supplied in later distributions.—D. C. EATON.

1. *Adiantum Kaulfussii*. Kze.—*A. platyphyllum*, Swz., ex Keyserling.
2. 2a. *Adiantum intermedium*. Swartz.
3. Near *Adiantum tetraphyllum*, Willd., but has acuminate pinnules, a character admitted by Hooker as belonging to this species.
4. *Adiantum pulverulentum*, L. (In some sets No. 4 has fruit on the end of the pinnule, and thus recedes from the type of this species.)
5. *Adiantum lucidum*, Swartz.
6. *Adiantum villosum*, L.
7. *Cheilanthes radiata*, R. Br.
8. *Polypodium aureum*, L.
9. *Hemionitis palmata*, L.
10. *Gymnogramme calomelanos*, Kaulf.
11. *Blechnum occidentale*, L.
13. *Asplenium Shepherdi*, Sprengel.
14. *Asplenium grandifolium*, Swz.
15. *Aspidium macrophyllum*, Swz.
16. *Aspidium subquinquefidum*, Beauvois.—*A. funestum*, Kunze, Grisebach.
17. *Aspidum molle*, Swartz.
18. *Aspidium patens*, Swartz.
19. *Aspidium amplum*, Mettenius.
20. *Phegopteris crenata*, Mettenius.
21. *Aspidium megalodus*, Mettenius.
22. *Aspidium*. nearest *A. conterminum*, Willd., but resinous-punctate, and the indusium apparently suppressed.
23. *Phegopteris draconoptera*.—*Aspid. draconopterum*, Eaton, Fil. Fendl. and Wright. p. 211.
24. *Lindsæa trapeziformis*, Dryander.
25. *Hemitelia grandifolia*, Sprengel.
26. *Trichomanes pinnatum*, Hedw.
27. *Lygodium venustum*, Swartz.
28. *Danæa elliptica*, Smith. The distinctions between this and *D. nodosa* are by no means clear. Mr. Charles Wright, who had good opportunities for observing both in Cuba, considered them forms of but one species.
29. *Selaginella serpens*, Spring.
30. *Aneimia Phyllitidis*, Swartz.
31. *Lygodium volubile*, Swartz.
32. *Alsophila nitens*, J. Smith. Distinct from *A. armata*, Br., which is repre-

sented by Mr. Wright's 950 and 1062, the former being also Hooker's *Hemitelia celolepis*.

33. *Blechnum longifolium*, H. B. K.
34. *Aspidium semicordatum*, Swartz.
35. *Asplenium lunulatum*, Swartz.
36. *Adiantum macrophyllum*, Swartz.
37. *Polypodium incanum*, Swartz.
40. *Gleichenia pubescens*, H. B. K.
41. *Aspidium trifoliatum*, Swartz.
42. *Selaginella patula*. Spring.
45. *Aspidium effusum*, Grisebach.
46. *Asplenium auritum*, Swartz.
47. *Asplenium crenulatum*, Baker.—*A. striatum*, Grisebach.
48. *Adiantum obtusum*. Desv.
51 *Gleichenia pectinata*, Presl.
52. *Polypodium neriifolium*, Schkuhr.
53. *Pteris pungens*, Willdenow.
54. *Aspidium*. Perhaps this is the *Nephrodium deflexum*, J. Smith, referred to in Syn. Fil., p. 292.
55. *Nephrolepis acuta*, Presl.
57. *Meniscium reticulatum*, Swz. Some of the specimens might pass for *M. serratum*, which is scarcely distinct.
58. *Polypodium elongatum*, Swartz.—*Gymnogramme elongatum*, Hooker.
60. *Alsophila ferox*, Presl.
61. *Asplenium cultrifolium*, Linn.
62. *Aneimia Breuteliana*, Presl.—*A. mandiocana*, Grisebach, not of Raddi.
63. *Acrostichum alienum*, Swz., var. *Purdiæi*, Grisebach.
66. *Polypodium sororium*, H. B. K.
68. *Polypodium vacciniifolium*, L. f.
69. *Acrostichum* (*Polybotrya*) *osmundaceum*, Hooker.
70. *Nephrolepis exaltata*, Presl.
71. *Adiantum polyphyllum*, Willd.
73. *Polypodium* (*Phymatodes*) *nematorhizon*, sp. nov.; caudice pertenui scandente, paleis ovatis ornato, frondibus (semipedalibus pollicem fere latis) consimilibus sub-sessilibus tenui-chartaceis lanceolatis acuminatis minute fusco-punctatis, subtus ad costam parcepaleaceis; venulis conspicuis reticulatis; areolis paracostalibus vacuis nisi venula inflexa libera signatis; areolis seriei secundæ soriferis, tertiæ minoribus sterilibus; soris rotundis a costa remotis venulas singulas vel binas coronantibus.—

This species comes between *P. Swartzii* and *P. lycopodioides*. It has the slender rhizome and the thin texture of the first, (but the chaff of the rhizome is broader and shorter,) and the fronds of the second. The venation varies a good deal even in the same frond. The paracostal areoles are broad, and often have a free veinlet running in from the outer margin of the areole. The sori are borne on either single veinlets or on a pair of veinlets, as in *Phlebodium;* and sometimes the paracostal areole opens into the fruiting areole outside of it, in which case the fertile venule bears a short branch or two below the sorus. A single sterile frond differs very little from the fertile fronds.

74. *Davallia inæqualis*, Kunze.
75. *Blechnum volubile*, Kaulf.
76. *Trichomanes sinuosum*, Richard.
77. *Pteris aquilina*, L., var. *esculenta*, Hooker and Baker.
78. *Adiantum tenerum*, Swartz.

79. *Oleandra rodosa*, Presl.
80. *Cyathea:*—not identified, and possibly new.
81. *Polypodium serrulatum*, Mettenius.
84. *Dicksonia cicutaria*, Swartz.
86. *Hymenophyllum ciliatum*, Swartz.
89. *Lindsæa stricta*, Dryander.
93. *Acrostichum flaccidum*, Fee.
95. *Davallia Saccoloma*, Sprengel.
98. *Phegopteris flavo-punctata*, Fee.
108. *Selaginella.* (not recognized.)
110. *Lindsæa trapeziformis*, Dryander, var. *falcata*, Baker.
114. *Oleandra neriiformis*, Cav.

Leaves of Darlingtonia Californica and their two Secretions.—Through the kindness of Dr. Gray we are permitted to publish the following interesting communication from Mrs. R. M. Austin, of Pratteville, Plumas Co., Cal.

"Found the sweet secretion, or lure, on all the new leaves of Darlingtonia having the orifices of the hoods open, and captured insects in the liquid at the bottom of the tubes. The sweet secretion was confined to the inner and rough portion of the hoods, the rim or fold around the orifices, and on the outside of the hoods, corresponding in extent to the rough inner part, on both sides of the "fish-tails," and extending down the wing to where it makes the outward bend. This bend can be seen in dried specimens. In no instance have I found the lure below this. I was fortunate in finding about a dozen new leaves having the orifices still closed, and the process of secreting the clear liquid going on. I noted carefully the places of secretion and manner, as well as I could. The liquid is poured, or, apparently, oozes out of the *lower or hairy* part of the tubes, the *rough* part of the hoods, and where the translucent *dots* are on the petioles there are minute globules of clear liquid. The little globules are not easily broken up or separated, but when I would touch them with the point of a pin or a pine leaf, would roll down over the velvety part of the tube, as little globules of mercury do on glass. I tried holding the tubes horizontally, and touching them. In this position the drops would move about and not be broken up. I then rubbed my fingers lightly over the velvety portions of the tubes, thereby removing the fine bloom that covers this portion of the tubes. Now, when I would touch the little drops with my pin they would be broken up and wet the surface. The velvety part of the tubes are always dry and clean, in new and old leaves.

I did not find any of the white larvæ in the leaves having closed orifices, but there were many in the new leaves having the orifices open, and also in the old leaves of last year. Many of the old leaves were pretty well smeared with the lure, which must have been secreted this season, as it could not have remained upon them during the heavy rain and snow storms of last winter."

The Big Trees, by J. G. Lemmon [Concluded from Oct. No.].—*Leviathan*, another prostrate monster, is about the same size, being 270 feet long, and 14 in diameter, but his body is not cut across or so broken as to reveal his rings.

The Father of the Forest.—Armed with the rule, derived as above stated, on the third day I approached the shattered trunk of this famous tree, fabled to have sprung from the earth soon after the deluge of Noah, over 4,000 years ago.

This huge patriarch has been shamefully overrated every way—his size given at 40 feet in diameter and his length at 450 feet. Exact measurement shows the diameter as only 18 feet at a distance of six feet from his roots, and his length about 300 feet. His trunk is broken or burned out in places, thus exposing cross sections where the rings of annual growth may be examined. With a hatchet and

sharp knife I smoothed spaces of wood in three places, widely removed from each other along the trunk, but each one-third of the distance between the bark and heart, and thereon counted one foot of rings, with the result following: First count, 66 feet from roots, 232 rings; second count, 196 feet from roots, 254 rings; third count, 210 feet from roots, 276 rings. The diameter of the tree at each place must be considered, and is as follows: First place of counting, 12 feet; second place, 11 feet, and the third, 10 feet. Now the estimated whole number of rings (age), at each place is obtained by calculating, viz:

232x6,	semi-diameter at	1st place,	1,392	Rings.
254x5½,	"	" 2d "	1,342	"
276x5,	"	" 3d "	1,380	"

Adding these products and dividing by the number of counts, the average of rings (age), is 1,371⅓ years only. Probable full age at base, 1,500 years.

One oft-repeated story is true, however; that of a passage through a part of his body large enough to admit horsemen. This passage burnt out of his heart commences at a point 66 feet from the roots and extends 120 feet, coming out where was once a knot-hole, now enlarged by relic seekers to a wide doorway. I saw several ladies ride horses of medium size through this wooden tunnel, and one day while passing, riding one of my horses and leading the other packed with bulky specimens I turned into the cavity and rode safely through. The ceiling overhead is four to six feet thick, so the grand promenade for visitors above is perfectly safe.

South Park Grove.—This grove contains about 500 trees, some of them of the largest class. One, the home of "Trapper Smith," is a vast swollen trunk at base, 90 feet in circuit and 30 in diameter. The "Livery Stable," which has received 22 horses at a time into its hollowed base, is 84 feet in circuit, and the "Primitive Church" is 81 feet. A fallen tree is 15 feet in diameter 20 feet from the roots. A cavity is burnt in it sufficient to comfortably shelter 25 or 30 horses, or to afford the passage of a Concord coach and its four-horse team for over 200 feet. Another, near "Trapper Smith's Cabin," and used by the tourists as a temporary shelter for their horses, is 16 feet in diameter and hollowed for a long way. These are certainly fair samples of the largest *Sequoias* both living and fallen, and the dimensions above given do not materially differ from some published statements, but counts and estimates of their rings reveal only 1,200 to 1,500 in number.

Other groves visited afforded exactly corroborative evidence, that though the dimensions, being easily determined, are often given accurately, the age has been generally grossly exaggerated.

As late as February last the writer saw a specimen of *Sequoia* in the Central Pacific railroad collection at San Francisco for the Centennial exhibition, which was sent from the Calaveras Mammoth Grove, and is marked "four thousand years old."

Now I firmly believe with Dr. Gray that this is an "over-statement," and, as I said, I am glad that it is such. Let India with her banyan tree—which by the way is a mass of trunks, not a single one—take the palm for growth of 4,000 years, let African baobab trees reach back still nearer to the Garden of Eden, let Palestine boast of her cedars of Lebanon growing since Moses' time, and let Australia present upon every exploration by the close observer trees of undeterminable ancient origin; all these trees of the old world almost, without exception, are slow-growing, fine-grained, stunted, gnarled, decrepit, unsightly old relics of past ages—only interesting because of their great age.

The famous baobab, *Adansonia digitata*, is the largest in circuit at base of any tree yet known, but it is only 70 to 80 feet high. The cedar of Lebanon, with an-

nual layers, so fine that a lens is necessary to distinguish them, is similar in shape, with round-headed top.

Now all observers admit that the California Big Trees, with their vast straight fluted columns, 200 to 300 feet high, and their immense crowns of finely divided, evergreen branches, are the most symmetrical and magnificent in form, the tallest and actually the largest in dimensions of any yet known in all the world. How satisfying to the pride of a true American, to reflect upon the inference derived from this comparatively new fact—formerly a most unwelcome one to the thoughtless, insomuch that loyal Californians prove their loyalty by declaring their belief in the great age of the Big Trees; hence the warfare to which Dr. Gray refers, and the great but pardonable assistance given to the erring side by eminent writers through their praiseworthy love of country.

But science always searches for the truth. Sooner or later the facts will come to be believed and they are always best. And the truth, in this case so long repressed, is most welcome because it gives foundation for the most reasonable and enthusiastic loyalty. Why, these grand giant trees are mere vigorous saplings yet, only 1,200 to 1,500 years old! Ages hence full-grown trees may be seen 50 feet in diameter and 1,000 feet high, only limited by the proximity of brother trees and the depth of the valleys where found. We can't expect them to be so unneighborly as to choke their brothers to death, nor to rise above the leveling winds that sweep over the canons of the Sierra. So let the old world pride itself upon old things, old nations, old creeds, old arts, old customs, old monuments; we of America rejoice that this is a new, unfinished world, with young yet colossal vegetable growths, strange yet beautiful animal forms, modern yet matchless peoples, adolescent yet full-fruit-bearing institutions, unprecedented yet unimaginable destinies!

"For still the new transcends the old,
In deeds and wonders manifold."

Gray's Flora of North America.—All the botanists will accept with sincere thankfulness this beginning of the new "Flora." A beginning at the middle, indeed, yet not a "beginning of the end;" but so that the work be done the order of its doing may well be left to his choice who is looked upon with one accord as the only one competent for its proper performance. If a preference might be expressed in regard to it, it would doubtless be that Dr. Gray would see fit to give next a revision of what is by far the most intricate and difficult of all the orders of our flora, viz: the *Compositæ*. No portion of the proposed volumes is more needed by botanists or will be more acceptable, and in none is Dr. Gray more truly the sole authority. As he has recently gone over a considerable portion of the ground in his work for the "Botany of California," this would be all the easier for him.

In looking over the present issue, some peculiarities of arrangement at once attract attention. There are no artificial keys either to genera or species. Under each order the ordinal character is followed by a synopsis of the genera, with concise but essentially complete characters, grouped together not only by sub-orders or tribes (where such exist), but also by minor subdivisions, and under characteristic headings, thus avoiding repetition, and leading most directly to the genus sought. When the genus itself is taken up, only such other details, general remarks and synonomy are given as may be needed to fully supplement the previous description. A comparison with the published volumes of "Torrey and Gray's Flora" will make the improvement of plan manifest, and show the appropriateness of the title which Dr. Gray has adopted. The same synoptical method, however, is not carried out in the treatment of species, though they are similarly grouped under common headings so far as they have essential characters in common. The specific descriptions themselves are full, but without redundancy or

needless repetition. Of their technical accuracy and finish, it is unnecessary to speak. It may perhaps be questioned whether it would not have been well, at least in the larger genera, to have subjected the species to the same process as the genera themselves. One would imagine that what is best in the one case, should be best in the other also. Experience in the use of the book should determine. As compared with the "Manual" the descriptions are much fuller, and yet, even with the additional synonyms, etc., the species occupy on the average but little more space. A synoptical key to the orders has been omitted, doubtless because it will come more properly in the first volume at the beginning of the *Gamopetalæ*, of which we have here only the concluding portion.

Much care has evidently been taken in the selection of the type used for different purposes, and in the general "get up" of the book. It is a satisfaction to see that Dr. Gray has not countenanced, in the writing of botanical names, the methods of punctuation and the disuse of capital letters so generally favored by American zoologists and entomologists, and which some would force upon our botanists. Whatever may be the rules of punctuation in Latin or in the Continental languages, in the use of the English language, the same principles should apply in writing upon botany as upon other subjects. In general, thus far, this has been the case. English-writing botanists, and most English Latin-writing botanists, as well, have been united in their adhesion to English customs in this matter, and it is to be hoped that they will so remain.

The portion of the gamopetalous flora here described includes 1,560 native species, belonging to 298 genera. The introduced plants add 26 genera and 96 species. A comparison with the number of species native to the region covered by the "Manual" (as given in the second edition) makes the probable entire number of phenogamous species in North America to lie between nine and ten thousand. The same conclusion is deduced from the number of polypetalous species as enumerated in the "Bibliographical Index." The mean result from the two comparisons is 9,378 species, so that 10,000 is very probably a closely approximate limit. Of the 298 genera, 120 have only a single species each. By far the most important order is that of the *Scrophulariaceæ*, containg 38 genera and 315 species, the next in order being the *Labiatæ*, with 37 genera, but only 189 species. These orders, with the *Ericaceæ*, *Borraginaceæ*, *Hydrophyllaceæ* and *Polemoniaceæ*, include nearly half of the genera and over three-fifths of the species. The largest genera are *Pentstemon* with 71, *Gilia* with 70, and *Phacelia* with 56 species.

As regards the distribution of this flora, it appears from a very cursory examination that it divides readily into an eastern, a central and a western section. The first may be considered as covered essentially by Gray's Manual and Chapman's Flora, and the last in good degree by the Botany of California. Taking these as a guide, and making to each the additions indicated by the present "Flora," it is found that the eastern division includes 610 native species, of which 130 are peculiar to the Manual, 205 to Chapman's Flora, and 275 common to both. The Botany of California includes 567 species, of which 58 belong also to the Atlantic States. Of the remaining 450 species, 48 are high northern and do not enter the United States, 8 are Mexican and not yet found within our limits, 290 are mainly southern, belonging to the warmer and dryer interior, and 103 are found only in the Rocky Mountains or the cooler region westward to Oregon. Had Greenland been included in the limits adopted by Dr. Gray, only two other species (*Veronica fruticulosa* and *Gentiana nivalis*) would have been added, and of these the latter is reported from Labrador.

Numerous additions and changes of nomenclature are made in the several sectional floras above mentioned—some of them new, many to be found in previous publications. About 40 species are added to the flora of the southern Atlantic

States, chiefly from Florida, and nearly 50 species to the flora of California. The changes to be noted in the flora of the Northern States, as given in Gray's Manual (edition of 1868) are less numerous, but some of them are of moment. The following list includes all of the more important:

Phyllodoce taxifolia is referred, with the other species of the genus, to *Bryanthus*, becoming *B. taxifolius*, Gray.

The species of *Azalea* are referred to *Rhododendron*, as was done by Dr. Torrey over 50 years ago, to whom the species are credited. *Rhodora Canadensis* also becomes *Rhododendron Rhodora* of Gmelin Syst. i. 694, 1796) instead of Don as stated.

The order *Aquifoliaceæ* is excluded as belonging rather to the polypetalous division. This is likewise the case with the closely allied southern order *Cyrilleæ*.

The name *Plantago Rugelii*, Decaisne, is restored for the plan which is referred in the Manual to *P. Kamtschatica*. *P. decipiens*, Barneoud, is also substituted for *P. maritima*, var. *juncoides*, which latter species is not found in the Atlantic States.

The genus *Steiranema*, Raf., is restored for the section of that name under *Lysimachia*.

Utricularia striata, LeConte, is referred to *U. fibrosa*, Walter. The questionable species mentioned in the Manual at the end of the genus is made var. *cleistogama* of *U. sublata*.

Phelipæa Ludoviciana becomes *Aphyllon Ludovicianum*, Gray.

Chelone obliqua, Linn., is added—a bright rose-colored species, ranging from Illinois and Virginia to Florida.

Pentstemon digitalis becomes *P. lævigatus*, Solander.

Gerardia integrifolia, Gray, is *G. lævigata*, Raf., and *G. setacea* (not Walt.) is *G. Skinneriana*, Wood.

Bartsia Odontites, Huds., is added as sparingly naturalized on our northern coast.

The varieties of *Lycopus Europæus* are established as species, viz: *L. sessilifolius*, Gray, *L. rubellus*, Mœnch, and *L. sinuatus*, Ell.

Pycnanthemum pilosum is made a variety of *P. muticum*.

Calamintha Nuttallii, Benth., is restored.

Monarda clinopodia, Linn., is added, intermediate between *M. didyma* and *M. fistulosa;* also *Physostegia intermedia*, Gray, of Western Kentucky and south-westward.

Stachys aspera, Michx., and *S. cordata*, Riddell, are restored for varieties of *S. palustris*, the var. *glabra* being referred to the former.

Onosmodium molle is made a variety of *O. Carolinianum*.

Lithospermum longiflorum is referred to *L. angustifolium*.

Myosotis palustris, var. *laxa*, becomes *M. laxa*, Lehm.

Cynoglossum Morisoni is transferred to *Echinospermum* as *E. Virginicum*, Lehm.

Heliotropium tenellum, Torr., is to be added as found in Kentucky.

Ellisia ambigua is reduced to a form of *E. Nyctelea*.

Phlox ovata, Linn., is restored for the broad-leaved form of *P. Carolina*, while var. *nitida* is referred to *P. glaberrima*, var. *suffruticosa*, Gray. *P. amœna*, Sims, is substituted for *P. procumbens* not Lehm.), and *P. Stellaria*, Gray, is added.

Diapensia and *Pyxidanthera* are united with *Galax* and the southern genus *Shortia* to form the order *Diapensiaceæ*.

Calystegia is returned to *Convolvulus*, where our species were originally placed by Linnæus.

The species referred in the Manual to *Bonamia* are transferred (following Benth. & Hook.) to *Breweria*, R. Br., as distinguished from *Bonamia*, Thouars, by the plicate corolla. It is perhaps through oversight that the species are not cred-

ited to Benth. & Hook., who refer to the Manual for the three known North American species.

The perennial forms of *Physalis* are referred to *P. Virginica*, Mill., instead of to *P. viscosa*, Linn., and to *P. lanceolata*, Michx., in place of *P. Pennsylvanica*, L.

Gentiana detonsa becomes *G. serrata*, Gunner, and var. *linearis* of *G. Saponaria* is kept distinct as *G. linearis*, Fries. The recent discovery of *G. amarella*, var. *acuta*, in Vermont should be noted.

Forsteronia difformis is transferred, with some doubt, to *Trachelospermum*, Lemaire, a genus of Eastern Asia.

Acerates paniculata is referred to *Asclepiodora*, a genus proposed by Dr. Gray for all the later species of *Anantherix*, Nutt., which is restricted to the single species upon which it was founded.

Ligustrum vulgare is inadvertently omitted.

Olea Americana is separated from *Olea*, Tourn., by Benth. & Hook., and carried to the Chinese genus *Osmanthus*, Lour.—Sereno Watson *in American Naturalist.*

[The following communication was mislaid at its receipt and came to the eyes of the Editors only in time for insertion in this number.—Eds.]

"Ferns of Kentucky, with sixty full-page Etchings and six Wood-cuts," etc., by *John Williamson.*—Louisville, John P. Morton & Co., 1878.—

The desire of the author of this work was to make a little hand-book, which the Fern-lovers of Kentucky would carry with them in their excursions, and which would enable them to easily recognize the ferns they might meet with. The descriptions of the species are given in popular language, as far as is possible, and every plant is illustrated by an etching made by the author's own hand. A few introductory chapters treat of the general nature of ferns, and of their structure, fertilization, classification, and the methods of collecting and drying or of cultivating them. The whole is written in clear, simple English, and makes a very readable book, which is certainly well adapted to the end desired. The author gives localities for all but the very commonest species, and very often there is a useful hint as to the best mode of cultivating some particular species. The etchings are mostly very characteristic of the species, and the author is certainly to be commended for his ingenuity in representing a large fern on a small plate. If I have counted them correctly, Mr. Williamson gives forty species as found in Kentucky, including two, *Asplenium Bradleyi* and *Trichomanes radicans*, which are not given in Gray's Manual, and omitting, as not native to his State, about eighteen or twenty, which occur in various parts of the Northern States. Of course, such northern ferns as *Aspidium fragrans* and *A. Lonchitis*, *Woodsia glabella* and *W. hyperborea*, are not to be expected in Kentucky, nor of course the New Jersey *Schizæa*, or the Northwestern *Allosorus acrostichoides;* but one would have supposed that *Struthiopteris Germanica* might occur in Kentucky, and perhaps *Woodwardia Virginica*. It is almost safe to promise that diligent search in the south-eastern counties will bring to light *Asplenium parrulum*, while *Phegopteris Dryopteris* and one or more of the little *Botrychia* may possibly lurk in some cool recess of the Cumberland mountains. At any rate, if they are there, we may be very sure that so enthusiastic and pains-taking a Pteridologist as Mr. Williamson will be sure to find them.—Daniel C. Eaton, *New Haven, July* 22, 1878.

Several notices of recent publications had been prepared for this number, but were crowded out by other matter. They will appear in the December number.—Eds.

BOTANICAL GAZETTE.

VOL. 3 DECEMBER, 1878. No. 12

ADDITIONS TO AND CORRECTIONS OF THE "CATALOGUE OF FOREST TREES OF THE UNITED STATES."—Since the publication of the "Catalogue of Forest Trees of the United States," in 1876, several omissions and errors have been noted, which I wish to make the subject of a few notes.

The *Anona*, No. 9 of the Catalogue, has been determined as *A. glabra*, L. See Dr. Chapman in BOTANICAL GAZETTE, for January, 1878.

Several trees that had been credited to Florida were omitted in the Catalogue from an opinion that they had not been verified in many years and might have been admitted improperly. Dr. Chapman stated that *Swietenia Mahogani* L, was admitted into the Flora on the ground of some pods found on the coast by Dr. Leitner. Specimens of this tree have recently been collected by Dr. Garber at Lignum Vitæ Key, west coast of Florida. *Hibiscus tiliaceus*, L., was also collected by him at Miami, Florida. Whether it is there indigenous or only naturalized we are not informed. It is the only Malvaceous tree within our limits. At the same place Dr. Garber also collected *Scutia sarcomphala*, Bong, and *Erythrina Corallodendron*, L., the latter with a trunk 17 inches in circumference. At Lignum Vitæ Key he also collected *Drypetes coriacea*, growing from 20 to 40 feet high. On the Keys opposite Sarasola he found a species of Olive 15 to 20 feet high, growing in the wild hummocks, where, he says, it may have been introduced, but is now well established. *Terminalia Catappa*, L, and *Psidium buxifolium*, Nutt., are described as Florida trees in Nuttall's addition to Michaux's Sylva.

Dr. Garber writes us that Dr. Chapman now thinks that *Ulmus Floridana* of the Southern Flora is only a smooth form of *U. Americana* with the flowers more racemose. We are not in possession of any more information respecting *Fraxinus Curtissi*, No. 211 of the Catalogue. Dr. Gray thinks it may be a form of *F. Americana*. Since the publication of the Catalogue Prof. Watson has established a *Populus Fremontii*, a poplar of New Mexico and Arizona, which had previously been regarded as a form of *P. monilifera*.

No. 272 of the Catalogue (*Quercus Prinus*, var., *monticola*) must be omitted, as Dr. Engelmann ("The Oaks of the United States," in Trans. St. Louis Acad. Sciences) has shown it to be a typical species, and very different from any others of the White Oak group, while No. 273 he describes as a distinct species under the name of *Q. Muhlenbergii=Q. Castanea*, Muhl. He considers *Q. prinoides*, Willd., a sub-species of this, the connection of forms being found in Kansas and Nebraska, where "it bears abundantly when only 1–3, or up to 30 feet high."

Dr. Engelmann's new species, *Q. tomentella*, from the Island of Guadaloupe, off the coast of California, should be added to the Catalogue.

No. 343 of the Catalogue, *Pinus resinosa*, Ait, grows 100 to 150 feet high in the Michigan pine region, according to Prof. C. E. Bessey, of the Iowa Ag. College.

No. 364 It now appears, according to Dr. Engelmann, that the specimens growing east of the Sierras, which have usually been referred to as *Pinus Balfouriana*, Jeff., are only a form of *P. aristata*, Eng. Specimens of the true *P. Balfouriana* we have since received from the Sierras of California and Nevada, which are identical with the original Oregon specimens on which the species are founded.

No. 384, *Abies amabilis*, Dougl., it appears, must be superseded by *Abies magnifica*, Murray, certainly a very appropriate name. The remarks of Mr. Dufur, quoted under this number, probably relate to a form of *A. Douglasii*.

The specific character of No. 386, *Abies nobilis*, Lind., seems to be somewhat unsettled. Drs. Hooker and Gray incline to the opinion that *A. nobilis* and *A. magnifica* may be forms of the same species. Further investigation is much needed.

No. 387, *Abies bracteata*, Hook. The statement that it grows in Oregon, made on the authority of Gordon, is probably a mistake. It is only positively known from the Santa Lucia Mountains, in Southern California.

No. 402, *Cupressus MacNabiana*, Murr. I had received under this name, from the coast range north of San Francisco, specimens of a *Cupressus* which was said to grow 50 to 100 feet high. I think it is the same which was described as a new species by Mr. Begg, of California, and at a meeting of the Philadelphia Academy of Science in 1876. My specimens are decided by Prof. Watson to be *C. Goveniana*, Gordon, which he thinks may be only a form of *C. macrocarpa*. Gordon describes both *C. MacNabiana* and *C. Goveniana* as only bushes 6 to 10 feet high. Probably one or two more California specimens of *Cupressus* may yet claim a place in the Catalogue.

No. 408, *Juniperus Virginiana*, var., *Bermudiana*. This variety according to Dr. Engelmann is not *J. Bermudiana*, L., which is a little known species of the Bermudas and other West Indian Islands.

No. 411, *Juniperus occidentalis*, var., *Texana*, is what Dr. Engelmann doubtfully calls var. *conjugans*. To me it appears more like a variety of *J. Virginiana*, but very possibly may be a distinct species

Juniperus pachyphlæa, Torr., must be added to the Catalogue. A fine wood section of this species was received from Dr. Palmer (collected in Arizona) after the Catalogue was published. It is very different in some characters from any other Juniper of our country.

Thrinax Garberi, Chap., must be added to the Catalogue. Found in rocky, pine woods near Miami, Southern Florida, by Dr. Garber, in 1877. See BOTANICAL GAZETTE, February, 1877.—GEORGE VASEY.

CASSIA NICTITANS.—This, in these parts common little annual, is now (October 15 dead—dry plants, covered with seed-pods are all we can find. To-day I came across a patch by the railroad, which the track-hands had mowed off early in the season. These had some dry pods from the early flowers, but a new growth came out after the mowing, and these plants were yet green, and flowering profusely.

Having had occasion to watch this plant very closely last summer on account of directions for my artist, I noticed that wherever fertilization was not accomplished the flowers wholly withered away, as is common in most plants. In these October flowers I find a large number form only a calyx and gynœcium having but imperfect stamens and no petals. Some produce petals, but these remain closed, and the stigma protrudes like a green pin-head on the mass of orange yellow. In many of these cases the anthers are polleniferous, but the closed petals seem to prevent any contact of pollen with the stigma. I can find no trace of pollen on any of the stigmatic surfaces. In the normal summer flowers the ovarium is quite large before the sepals and petals fall. In these they are extremely small when the floral envelopes have disappeared, and remind one very much of the appearance of cleistogenous flowers of Amphicarpœa or Impatiens, and like these they evidently go on and perfect their capsules, but unlike the true cleistogene flower, produce no seeds. In none of the capsules apparently formed in this way could I find a single seed.

The interesting lesson is that while under some circumstances the ovarium no more than the seed can be perfected without pollenization; under others the one may be

perfected, and it is particularly interesting to one who like me, believes that the behaviour of flowers in relation to matters connected with fertilization is much more varied than many suppose.—THOMAS MEEHAN.

PLANTATIONS AT WARRIORSMARK, PENNSYLVANIA.—It is not often, in this part of Pennsylvania, we can find a piece of land protected for a series of years alike from the inroads of cattle and from the labors of the agriculturalist.. We have such a preserve here, and I wish to tell you how it was planted and what is growing on it. It is only a story of what the birds, squirrels and winds are doing. Did you ever visit a Pennsylvania iron-ore bank, where the brown Haematites are raised from their beds of clay and sand, by windlass from shafts, or by open cut? Such a location is our preserve. Forty years ago, on the summit of a hill, 1,200 feet above tide, surrounded on all sides by cultivated lands, ore was found. A strip of land ten rods wide by fifty rods in length, seems to have defined the largest deposit. For many years thousands of tons of ore were mined. The ore was found on the surface and at varied depths below the surface, reaching to one hundred and ten feet; sometimes interrupted by a clay or sand belt, which, coming to the mouth of the shafts intermingled with ore, made large refuse deposits. Irishmen with carts, wagons, mules and "ore buggies" held exclusive possession, and all traces of vegetation disappeared. The surface was irregular. Abandoned shafts made crater-like pit holes; open cuts over heavy ore deposits, left their mark in the shape of drepressions from ten to fifteen feet deep, with varied exposures. This area, in connection with some land then, and for many years preceeding, under the usual cultivation of a farm, was fenced in, and planted in 1858, with European Larches and *Robinia Pseudacacia*. Cattle, have been carefully excluded, and no agricultural implement has been permitted to be used inside its boundary since that date. For many years under this treatment it did not promise much in the line of beauty. The clay banks around old shafts remained bare and yellow, and to this day defy all the mellowing influences of our atmosphere, refusing to bring forth floral life, excepting here and there a straggling specimen of *Pinus rigida* and *Populus grandidentata*. The Larches have made a fine growth, ranging from twenty to forty feet high. An irregular carpet of grasses, chiefly *Poa brevifolia*, *Danthonia spicata* with *Carex Pennsylvanica* now covers that portion of the inclosure where the ore was mined. The native wild plants began to reappear, and every year some old friend in this new location has greeted us. Our census including foreign agricultural waifs enumerates upwards of one hundred and forty species, and still they come year by year, a pleasant surprise. This morning I note the first appearance of *Lycopodium clavatum* and *L. lucidulum*, close to two other species of that beautiful family, which have long lived in that area, viz.: *L. complanatum* and *L. dendroideum*. We have many seedling Larches. One large Red Maple has given an annual colony of young plants from the scattering of seeds by the winds, 'till they may be counted by the hundred. *Rubus villosus* takes possession of all unoccupied openings, and is making such progress that we will soon be constrained to limit its increase. This preserve is now very much admired for its beauty. I add a list of species noted as growing inside its area, which is about three acres in extent:

Abies Canadensis,
Acer rubrum,
Achillea millefolium,
Ambrosia artemisiaefolia,
Amelanchier Canadensis,
Agrimonia parviflora,
Anemone nemorosa,
Antennaria plantaginifolia,
Apocynum androsaemifolium,
Aralia nudicaulis,
Archangelica hirsuta,
Asclepias Cornuti,
Asclepias obtusifolia,
Asclepias tuberosa,
Aspidium spinulosum,
Aster cordifolius,
Aster ericoides,
Aster macrophyllus,
Aster prenanthoides,
Aster punicus,
Aster sagittifolius,
Azalea nudiflora,
Baptisia tinctoria,
Bidens frondosa,
Bidens connata,
Botrychium lunarioides,
Botrychium var dissectum
Calamintha clinopodium,
Carya tomentosa,
Capsella Bursa-pastoris,
Carex Pennsylvanica,
Carex laxiflora,
Carex triceps,

Chimaphila maculata,
Cerastium nutans,
Cerastium vulgatum,
Chimaphila umbellata,
Carex stipata,
Castanea vesca,
Ceanothus Americanus,
Carex scoparia.
Carex Muhlenbergii,
Carex rosea,
Cnicus lanceolatum,
Comptonia asplenifolia,
Cornus paniculata,
Cornus alternifolia,
Conium maculatum,
Crataegus coccinea,
Danthonia spicata,
Epigæa repens,
Eragrostis capillaris,
Erigeron Canadense,
Erigeron bellidifolium,
Erigeron Philadelphicum,
Euphorbia corollata,
Euphorbia maculata,
Fragraria Virginiana,
Gaylussacia resinosa,
Gnaphalium decurrens,
Gnaphalium polycephalum,
Hedeoma pulegioides,
Hieracium scabrum,
Hieracium venosum,
Hieracium paniculatum,
Hypericum corymbosum,
Hypericum perforatum,
Juncus tenuis,
Juncus effusus,
Juniperus Virginiana,
Kalmia latifolia,
Lactuca elongata,
Larix Europea, seedlings.
Lespedeza hirta,
Lobelia inflata,
Luzula campestris,
Lycopus Virginicus,
Lysimachia quadrifolia,
Lycopodium clavatum,
Lycopodium complanatum,
Lycopodium dendroideum,
Lycopodium lucidulum,
Magnolia acuminata,
Nyssa multiflora,
Œnothera biennis,
Œnothera pumila,
Oxalis Acetosella,
Panicum autumnale,
Panicum depauperatum,
Panicum latifolium,
Phleum pratense,
Pinus strobus,
Pinus rigida,
Phytolacca decandra
Poa brevifolia,
Poa pratensis,
Polygonum Pennsylvanicum,
Polygonatum biflorum,
Populus grandidentata,
Potentilla Canadensis,
Prunus serotina,
Pyrola rotundifolia,
Pyrola chlorantha,
Pyrola elliptica,
Pyrola secunda,
Pyrus arbutifolia,
var melanocarpa,
Pyrus coronaria,
Pyrus aucuparia,
Quercus alba,
Quercus coccinea.
Quercus prinoides,
Quercus ilicifolia,
Rosa lucida,
Ribes hirtellum,
Rubus villosus,
Rubus Canadensis,
Rudbeckia hirta,
Rumex acetosella,
Salix humilis,
Sambucus Canadensis,
Sassafras officinale,
Saxifraga Virginiensis,
Senecio aureus,
var obovatus,
Sisyrinchium Bermudiana.
Setaria glauca,
Solidago arguta,
Solidago bicolor,
Solidago cæsia,
Solidago Canadensis,
Solidago ulmifolia,
Solidago nemoralis,
Solidago squarrosa,
Spiranthes gracilis,
Thalictrum anemonoides,
Trifolium repens,
Trifolium pratensis,
Uvularia perfoliata,
Verbascum thapsus
Vaccinium Pennsylvanicum,
Vaccinium stamineum,
Vaccinium vacillans,
Viola cucullata,
Viola sagittata,
Vilfa vaginæflora,
Vitis cordifolia,
Veronica officinalis,
Veronica peregrina.—

J. R. Lowrie.

Potato Pierced by Grass.—Mr. A. C. Brigham, of Trumbull, Ohio, sends me a freshly dug potato which has been pierced completely through by a growing stem of grass; probably *Poa pratensis*. The potato is three inches long and two inches thick, of regular shape, and with a smooth, uninjured skin. The grass entered from the side, near the "stem" end of the potato, and issued at the "eye" end, its course being somewhat curved. If it entered vertically, as is probable, it emerged horizontally, being carried forward, perhaps, by the contemporaneous growth of the potato. The original root of the grass was not seen, that part being broken away an eighth of an inch outside of the point of entrance. Dissection reveals the perfect stem of the grass imbedded in the center of the potato. After emergence the grass struck upward in a vigorous shoot five inches beyond the potato, appearing above the ground in half a dozen green leaves. Many long, tender roots extend out from the stem above its point of liberation. The potato suffered no discernible irritation at being thus pierced, and the grass, also, was in no way exhausted by its exploit.—Albert A. Wright, Oberlin, Ohio.

Nelumbium luteum.—I just saw specimens of *Nelumbium luteum* from Grass Lake, Lake Co., Illinois. It is a new locality for the plant, which is by no means common here.—M. Harrington, *Sycamore, Ill.*

ASTER TRADESCANTI AND A. MISER.—In response to a query in a recent GAZETTE, we have received the following:

A. Tradescanti is distinguished from *A. miser* by its greater smoothness; by the more definitely racemed inflorescence; and by the less marked serration of the middle of the more slender leaves; in var. *fragilis* the margin is entire. Both species are perplexingly variable, but, in my judgment, they may be clearly determined by the above points.—M. B. F.

A VALUABLE FERN CATALOGUE.—Mr. Geo. E. Davenport has in preparation, and nearly ready for printing, a Catalogue of the N. A. Ferns (north of Mexico) in the Davenport Herb., Mass. Hort. Soc., with notes giving localities, time of collection, names of collectors and donors, with occasional critical remarks, which he will publish provided he can obtain subscribers enough to enable him to do so. It will probably make a neat pamphlet of some twenty pages, and be a complete and accurate catalogue of N. A. Ferns based on actual specimens, with an appendix giving a list of all the doubtful species. The price will, of course, depend upon the number of subscribers, but probably in no case will it exceed 50 cents per copy. Subscriptions may be sent direct to Mr. Davenport's address at Boston, Mass.

THE LAW GOVERNING SEX.—Mr. Thomas Meehan referred to his observations originally reported to the Academy, developing an entirely new view of the laws of sex from that formerly prevailing, and which proved that what we called the female sex or final reproductive element in flowers, required a higher grade of nutritive power to perfect than the male. Though numberless facts have proved this point, there have always been some which, though they have offered no obstable, have at least not been capable of explanation by the light of this theory, and among these have been some connected with diœcious plants. Among hermaphrodite and especially among monœcious plants there has been no difficulty in tracing the operation of this principle. In such coniferous trees as pines, firs, and larches, there is no difficulty in perceiving that branches once bearing female flowers, and maturing cones and seeds, produce nothing but male flowers when the branches come in time to be weakened by the shade of younger branches, or in some other way are imperfectly nourished. But when we come to the red cedar, *Juniperus Virginiana*, where cone trees are always wholly male, and others always seed-bearing, no difference could be found in the vigor of the trees. As in the monœcious cases we found the female element in exact proportion to nutritious advantages, we looked for the seed-bearing trees of the red cedar to be more vigorous than the males, but found instead all equally vigorous and healthy.

The enormous crop of seed borne by the silver maple this year, together with the confirmation of their truly diœcious character, have not only furnished an explanation of the apparent anomaly, but at the same time affords one of the best possible illustrations of the new theory.

As already noted in communications to the Academy, the flowers in *Acer rubrum* and *Acer dasycarpum* are alike in all trees when the petals first open. The anthers seem perfectly formed when another stage of growth commences. The pistils elongate in the female flowers while the filaments remain stationary, and the anthers never open; while in the male flowers the pistils do not grow, but the filaments elongate, and the anthers are carried on to perfection. Each tree is in fact strictly a male or a female tree.

It is a matter within common knowledge that after the maturity of the immense crop of seeds last month, the bearing trees were comparatively leafless, while the completely barren male trees abounded with foilage. There is a well-known morpho-

logical law, that the parts of flowers and the resulting seed vessels are metamorphosed leaves. In the case of these maples, the female trees, engaged in developing primordial leaves to perfect fruit, make few leaves in addition to those they started with in the spring, until, after several weeks, their fruitage has been completed. But the male flowers, dying immediately after perfecting their pollen, the male trees push into a heavy leaf growth, clothing the tree at a very early period with a dense foilage.

But another consideration intrudes itself here. The woody parts of a tree are made up mainly from the atmosphere through the medium of the leaves, and we may suppose that the greater the proportionate amount of leaves, the greater would be the woody product Applying now these acknowledged principles to these maple trees, we find some remarkable results. Notwithstanding the male trees are relieved from the enormous strain on the powers of nutrition which the annual and often wonderfully heavy crops must entail; and notwithstanding they have, as in many cases this season especially, the advantage of a hundredfold more foilage at so early a period in the season, male trees are no larger, vigorous, or in any way more healthy than the female ones. In a crowded group of five trees, where a female tree is the central one, and a male on the outside, the male, with every advantage of food for the roots, and light and air for its large crop of leaves, and which happens to be an unusually large mass of foilage even for a maple tree, the girth of the trunk is four feet three inches, while the crowded female tree is five feet five inches, or two inches larger, with all its disadvantages.

We have been looking for weaker individuals in the male than in the female trees. But since he had first made his discoveries we have learned to distinguish much more clearly between vegetative and reproductive force. A large man is not necessarily a strong man in what we should call vital power; but we measure it by endurance under severe trials, and we see now that we need not have looked for weaker trees among the cedars or other dioecious trees, so much as for powers of endurance under reproductive or other essentially vital strains. Here we have this power thrown heavily in favor of the female tree; and he submitted that dioecism in trees instead of being an objection, is a powerful argument in favor of his views. [Verbal communication of Mr. Thomas Meehan to Acad. Nat. Sci. of Phila., June 4, 1878. From Proceedings, Part II.]

Recent Publications.—*Forest Geography and Archæology.—A Lecture delivered before the Harvard University Natural History Society, April 1st, 1878. By Asa Gray.*—In this masterly paper the author comes to the conclusion, fully corroborated by late geological discoveries in the arctic regions, "that the high, and not the low, latitudes must be assumed as the birth-place of our present flora; and the present arctic vegetation is best regarded as a derivative of the temperate." The distribution of forests is explained to be in accordance with the well known principles of physical geography, but no attempt is made to account for the anomalous features of the Pacific forest, as the author intimates it would lead simply to conjectures. The similarity between the vegetation of our own Atlantic slope, and that of the western coast of the Pacific, is well brought out and is so remarkable that Dr. Gray professes he will not be surprised to hear of a *Sarracenia* or *Dionæa* turning up in Eastern Asia. The object of the lecture was well accomplished in showing "that the races of trees, like the races of men, have come down to us through a pre-historic period; and that the explanation of the present condition is to be sought in the past, and traced in vestiges, and remains, and survivals; that for the vegetable kingdom also there is a veritable Archæology.

Report of the Botanist: [Chas. H. Peck.] Made to the Regents of the University of the State of New York. From the Thirtieth Annual Report.—The contents of this Report are best expressed by the summary given by the author himself. Suffice it to

say, that Dr. Peck is a most indefatigable worker among our fungi and it almost seems probable that his name will be appended to as many North American fungi as that of Linnæus to our phænogams. Since the date of the last report, specimens of 165 species of plants have been mounted and placed in the Herbarium, of which 130 were not before represented in it. Specimens have been collected in the counties of Albany, Essex, Greene, Hamilton, Otsego, Rensselaer and Saratoga. These represent 132 species new to the Herbarium, 129 of which are fungi, of these 60 are regarded as new or previously undescribed species. Of course the new species are described and some of them figured in the two plates at the end of the report.

Contributions to the Flora of Iowa—No. III. By J. C. Arthur.—The author adds some 65 species to his catalogue of the Iowa flora and also describes three not found in Gray's Manual, viz.: *Desmodium Illinoense*, Gray, *Scutellaria parvula*, Mx., var. *mollis*, Gray, and *Echinospermum deflexum*, Lehm. *Amarantus Blitum* (No. 668) of the catalogue proves to be *A. blitoides* of Watson, a description of which is appended; and *Aster Novi-Belgii* (No. 371) is to be stricken out.

The Pine, its life and importance in Essex County. By John Robinson.—A good description is given of the life of a pine, commencing with the seed, then follows an account of the Conifers found growing in Essex County, Mass. There are 10 of them, viz.: *Pinus rigida*, *P. resinosa*, *P. Strobus*, *Abies nigra*, *A. Canadensis*, *Larix Americana*, *Cupressus thyoides*, *Juniperus communis*, *J. Virginica*, and *Taxus baccata*, var. *Canadensis*.

Science News, Vol. 1, Nos. 1 & 2, November 1 & 15.—We have here a new candidate for public favor, published by S. E. Cassino, under the editorial management of Ernest Ingersoll and Wm. C. Wyckoff, of New York. It is a semi-monthly periodical of 16 pages, octavo, printed in two columns, and is furnished at $2.00 per annum. According to the salutatory address "To the Public," its object is a most general one, namely, to advance the interests of science. It promises to give prompt publication of scientific news in every department of science, and especially in that of natural history and biology. The first two numbers carry out very well the promise of the editors, and from the prominent names enrolled among the contributors subscribers can undoubtedly expect more than the worth of their money. We wish the new enterprise every success, and that it may accomplish what many scientific publications of to-day do not, that is, pay its way. We might express the wish that the paper at first sight did not so much resemble an adversising sheet, but the turning over of a few pages reveals the substance within.

Bulletin of the Torrey Botanical Club, Oct.—Prof. Eaton announces that four new species of tropical ferns have been recently discovered in Florida, one by Dr. Garber, one by Mr. A. H. Curtiss, and two by Mr. W. H. Shockley. They are *Ceratopetris thalictroides*, Brongneart, *Cheilanthes microphylla*, Swarts, *Aplenium firmum*, Kunze, and *A. ciculatarium*, Swartz. Mr. Meehan writes that the *Calluna vulgaris* reported as growing two miles from Egg Harbor City, New Jersey, is not indigenous at all, but was planted there by a man from England. He thinks that the other reported localities had better be more thoroughly examined. Mr. J. W. Congdon makes the very flattering announcement that *Shortia galacifolia*, Gray, has been discovered by Mr. M. E. Hyams, of Statesville, N. C. It was found last year in McDowell & Co., N. C. The plant is so rare that heretofore only one known specimen existed, and that was at the Jardin des Plantes, in Mychaux's herbarium.

The American Naturalist, Nov.—This number is especially rich in botanical articles, containing no less than three, besides the general notes. They are "*Aspidium spinulosum* (Swartz) and its Varieties," by Geo. E. Davenport; "On the Natural Succession of the Dicotyidens," by Lester F. Ward; and "About Weeds," by W. W. Bailey. Mr.

Davenport, after a study of *aspidium spinulosum* and its varieties, comes to the conclusion that the varieties included under the *intermedium* and *Boottii* are entitled to specific rank. The latter he accordingly restores to specific rank as *A. Boottii*, Tuckerman, but the former cannot be called *A. intermedium*, Willd., for that name has been wrongly applied to our plant, and Willdenough's description has nothing to do with the form in question, but with *A. spinulosum*. This leaving no name for our American form, Mr. Davenport gives the name *A. Americanum*. Mention is made in the general notes of a new classification of the Vegetable Kingdom proposed by Prof. Carnel, of Pisca, in his recent work La Morfolojia Vegetale. He proposes to divide it into five primary groups, namely: 1. *Phanerogamia*; 2, *Schistogamia*, including *Characeæ* only; 3, *Prothallogamia*, or Vasucular Cryptograms; 4, *Bryogamia* (synonymous with *Muscineæ*); and 5, *Gymnogammia* (Thallophyta or Cellular Cryptograms.

—A curious result of the effects of sharp frost is noted by a correspondent of *The London Gardeners Chronicle*. Polyanthus flowers of very deep crimson hues, especially those approaching to black, presented an appearance as if scorched, while those of light colors were comparatively uninjured. Early primroses in the open ground showed the same peculiarity.

—The Iowa Agricultural *College Quarterly* cites census statistics of 1875, showing that the area of natural forest in that State is but $6\frac{1}{2}$ per cent. of the whole surface, and that fully half of all the trees are along the Des Moines River. Up to the date named the woodlands had been increased artificially one thirty-third.

—According to *Revue Horticole*, the Dutch protect fruit blossoms from untimely frost by placing vessels of water at the base of the tree or plant, taking care to remove ice if any forms. Doubtful as the plan appears, it is said to be more efficient than coverings of canvas or branches.

—A gardener in England removes green algal and confervoid growth from damp walls, and keeps it down a year or longer by painting with a solution of chloride of lime. The same application is made to gravel walks with a watering-pot, with equally satisfactory results.

—Among noteworthy specimens seen at the recent Edingburg Fungus Show was a *Polyporus giganteus*, three feet six inches in diameter, and a puff-ball (*Lycoperdon giganteum*), fifty-four inches in circumference and weighing twenty pounds.

—An old record refers to a plant of China-grass (*Bœhmeria nivia*) which, sent from England to the island of Jamaica in 1854, attained a height of six feet in fourteen days.—*N. Y. Times*.

Prospectus.—With this number we close the third volume of the Botanical Gazette. We enter upon Volume IV. with a greater feeling of stability than ever before, and with the hope that the support of the coming year will put all questions of the permanency of the journal far out of sight. In three years we have established such a patronage and position that the Gazette should command the confidence and energetic support of all botanists. If such will be given we can promise much greater things. We have been urged to raise the subscription price, but have concluded to keep it at its present rate, at least, for the coming year, hoping that we will obtain subscribers enough to justify us. We hope to have the continued support of the leading botanists of the country, and can promise to subscribers the very best botanical matter that can be procured for a journal of such limited capacity. We would also call attention to our rates of advertisement, and hope that the patrons of the Gazette who have anything pertaining to botany to sell, exchange, or procure, will make use of its columns. Subscriptions and articles should be sent in at once, that the work of the coming year may be fairly before us.—Eds.

BOTANICAL GAZETTE.

Vol. IV. JANUARY, 1879. No. 1.

To Botanists.—We know that it is not customary to advertise a journal in the space generally devoted to contributors, but we wish this to be not merely an advertisement, but a special address to all botanists. The Gazette has now entered upon the fourth year of its existence and has steadily grown in favor. It will appear this year in a somewhat different form, which we hope will meet the approval of all our friends. The type is larger and the number of pages increased to twelve. It has been suggested that we raise the subscription price, but we have concluded to keep it at its present rate for another year, desiring to reach as many botanists as possible. It is extremely difficult to keep in running order a journal devoted exclusively to one department of science and for this reason we call upon all botanists to lend us their aid both by subscription and the contribution of articles. One dollar a year is not much for any botanist to spend upon a paper devoted to his own department, and if all the working botanists of this country would unite, they could support a first-class journal. It was with some visionary hopes that such a thing would finally grow out of it that the Gazette was undertaken, and those hopes have not yet been abandoned. We have already received cordial support from a large class of botanists and they have our hearty thanks, but we would ask one thing more of them, and that is that they try to induce their botanical acquaintances to subscribe and write for the Gazette.

We have put on a cover for the double purpose of protecting the body of the Gazette and giving us room for advertisements, and to this also we would call the attention of botanists. If any of you wish to exchange, sell or procure plants, the simplest and cheapest way is to advertise. A few lines of advertisement will thus accomplish what one or two hundred letters can not. Books, microscopes, anything pertaining to the science should be constantly presented to the eyes of working botanists.

The material of the Gazette will be just what its subscribers make it. If they promptly send us contributions, long or short, so that we can have

a large amount of material to select from, we can promise the choicest of reading. It is desirable to make the articles as varied as is possible in a single branch of science, but we have concluded not to publish bare lists of plants as not being of sufficient interest to the general reader. A large edition of this number has been sent out as a specimen number, and we hope that it will procure an immediate and favorable response from all who receive it. We can, as formerly, promise our readers contributions from the leading botanists of the country, but we want notes from the rank and file as well, for it is from them after all that our chief support must come. We press our claims upon you now with more boldness as we have safely lived through the experimental age and have an established enterprise to call upon you to support.

PANICUM LITTORALE, *n. sp.*—Mr. Chas. Mohr has sent me from Mobile, Alabama, specimens of a *Panicum* which I cannot find described. It grows among the drifting sands of the Gulf coast, having strong running rhizomas, sending up from the joints upright culms about a foot high, very leafy below, the sheaths large and loose, those of the lower joints, where covered with sand, being destitute of blade; above, the leaves are rigid, distichous, standing out at a strong angle from the culm, 3 to 4 inches long, 2 to 3 lines broad at the base and gradually narrowed to the acute point, becoming convolute, the sheaths, margins and lower surfaces sparsely hairy, the upper leaves rather distant and narrower; the panicle shortly exserted, 2 to 3 inches long, of 5 or 6 branches, single at the joints, but little branched and loosely flowered and not pubescent; the spikelets are small, about a line long, smooth, the sterile flower staminate, of 2 palets, the lower glume very short, broad, obtuse, $\frac{1}{3}$ or $\frac{1}{4}$ as long as the upper, which is ovate, pointed, 7-nerved, and about equalling the upper flower.

In habit this species seems related to *P. amarum*, Ell., though it is smaller, with shorter leaves and much smaller panicle and floweor. From its habitat Mr. Mohr suggests that this may properly be called *P. littorale*, in which I concur, as I cannot find that name previously appropriated. Mr. Chas. Mohr will furnish specimens on application.—GEO. VASEY.

In the GAZETTE for December, where I spoke of *Fraxinus Curtissii* there should have been a reference to Dr. Gray's Synop. Flora N. A., page 75.—G.V.

SHORTIA GALACIFOLIA RE-DISCOVERED.—A hundred years ago the elder Michaux collected, somewhere in the mountains of North Carolina, a specimen of a Pyrolaceous-looking plant, out of flower, or rather with

corolla and stamens fallen, a dehiscent capsule enclosed in a persistent imbricated calyx and surmounted by a persistent style. It was noticed in the *Flora Boreali-Americana*, which was prepared by L. C. Richard from Michaux's collections. Early in the year 1839, I found and examined this specimen in Michaux's herbarium, and I received from the hand of M. Decaisne a drawing and some fragments of it. In a paper treating of the botany of these mountains, contributed to this Journal in January, 1842, I ventured to found a genus upon this plant, under the above name, trusting that the diligent search prosecuted by myself and by all botanists visiting the region would duly bring it to light. The protracted failure of these endeavors has thrown an air of doubt over the minds of my associates in the search, as to the actual existence of any such plant. In 1868, I had the pleasure of announcing in this Journal (Ser. II, xi, 402) the discovery of this genus, not indeed where we were looking for it, but where experience had led me to expect that any or every peculiar Atlantic States type might recur, namely in Japan. That is, I identified the genus with the *Schizocodon uniflorus* of Maximowicz, which, singularly enough, was known only by specimens in the same condition *i. e.*, with calyx and gynœcium, but neither corolla nor stamens. The patent relationship of these specimens to *Schizocodon soldanelloides* of Zuccarini gave ground for a conjectural restoration of the missing organs; and I ventured the opinion that *Shortia* (of 1842) and *Schizocodon* (1843), whether of one genus or two, were most related to *Diapensia*. In the year 1870 (in Proc. Am. Acad., viii, 243) I reconstructed the order *Diapensiaceæ*, referred to a separate tribe, *Galacineæ*, the genera *Galax* and *Shortia*, and adopted the idea of a probable identity of *Schizocodon* with the latter. The next year Maximowicz decided that the two genera should be distinct, founding this conclusion upon the close seed-coat (confirmed in the Japanese *Shortia uniflora*) and the campanulate corolla, with lobes undulate-crenate instead of fimbriate, and upon some characters in the stamens, all these taken from a rude figure in the Japanese *Soo Bokf.*, iv. fol. 8, which is supposed to represent *S. uniflora*, although the leaves would (as Maximowicz rightly observes) refer it rather to *S. galacifolia*, these being all represented as acute or in one dubious case subcordate at base, instead of reniform-cordate. The identification as to genus is doubtless correct; but the analysis of the flower is too rude for reliance as to all relating to the stamens and the squamulæ. Happily I can now give the characters from an actual blossom.

For I have now received, at first indirectly from Mr. J. W. Congdon,

and at length directly from Mr. M. E. Hyams, of Statesville, North Carolina, a flowering specimen of the long-sought *Shortia galacifolia*. Mr. Hyams, or more strictly his son, George McQueen Hyams, collected it on a hill-side in McDowell County, N. C., in the district I had indicated as the most probable locality, viz: east of the Black Mountain. It was collected in May, 1877, but as its remarkable interest was unknown, it has only now been communicated to me. I will only state here, that the distinction between the two genera is probably definite, that our plant is perhaps identical in species with the one figured in the Japanese books (rather than with *S. uniflora*), although the corolla in ours is seemingly white, and the crenulation of the border of the lobes is stronger than that in the description and often double; that the anther, though not agreeing with Maximowicz's character, probably may agree with this Japanese representative, and may be generically distinguished from that of *Schizocodon*, unless other species afford transitions; and that the squamulæ are like those of *Schizocodon* and fully as large, but broader, narrowed or almost unguiculate at base, and attached to the very base of the corolla, while the filaments (said by Maximowicz to be "libera" probably in the sense of free from the corolla, as they are represented in the Japanese figure) are adnate to the corolla for most of their length. That is, the phrase "filamentis tubo corollæ adnatis" in Benth. and Hook. Gen. Pl. is correct, but I know no then extant authority for it, except the analogy with its relatives. Less fortunate are the characters: "Antheræ erectæ, didymæ . . . loculis oblique dehiscentibus," derived by Maximowicz from the Japanese figures, and the "antheræ breves . . . loculis divergentibus" of the Genera Plantarum; the anthers being larger than in any other genus of the order, and the cells in a just sense longitudinally dehiscent. But the anther is—as in all its relatives except the anomalous Galax—inflexed or incumbent on the apex of the filament, in this genus about horizontal, as are consequently the marginal sutures which run the whole length of the elongated-oblong cells. The pollen is simple and obscurely trigonous as seen on the field of the microscope. The style and stigma are as in *Schizocodon*, but the latter more capitate.—A. G. *in Am. Jour. for December.*

Plantago Rugelii.—In a letter from Dr. J. J. Davis, of Racine, Wisconsin, the following is of general interest: "I find that people who are in the habit of indulging in plantain "greens" have long known that there were two kinds; the one *P. Rugelii*, toothsome; the other, *P. major*, bitter

and unpalatable. They distinguish *P. Rugelii* by a character I have not seen mentioned, viz: the petioles being purplish toward the base, a character that holds good so far as I have observed and one easily distinguished. That eminently practical botanist, the old cow, accepts *P. Rugelii* readily but rejects *P. major* after an olfactory test. It would seem that the reputed medicinal properties must reside in *P. major*, although both have been used indiscriminately, of course."

THE FLORA OF NORTHERN INDIANA.—Having been occupied mostly with the flora of that part of Indiana bordering upon the Ohio river, I had often looked longingly upon the map of the state at the northern tier counties, bordering upon Michigan lake and state, and well filled with small lakes and tamarack swamps. It seemed as if some of our best plants must be found there, and in my preparation for publishing a catalogue of the flora of the state, I could find no report or no working botanist from that region. Last summer an opportunity presented for making a hasty survey for myself and the result was most encouraging. Although many very excellent species were obtained, the richest result to my mind was the fine prospect of good things that might reward a diligent search, rather than those those that were actually obtained. Accompanied by my enthusiastic pupil and assistant, Mr. Chas. R. Barnes, I spent some three or four weeks along the line of the Lake Shore and Michigan Southern Railroad, which crosses the state exactly in the region I wished to traverse. The Kankakee river forms a natural boundary on the south side of the northwestern corner of this region, a slow, sluggish stream as it crosses Indiana, but rapid enough in Illinois. The consequence is that it has spread out on either side into a succession of extensive marshes, which render approach to the river well nigh impossible in many places. To the east lie the headwaters of the St. Joseph and Tippecanoe rivers, both of which are lost in an intricate system of small lakes, reminders of the time when one enormous lake covered it all. This is the lake region of the state, in no case extending farther south than the second tier of counties, and containing thousands of depressions, filled either with clear bodies of water or swamps. The time of our visit was rather unfortunate for the best results, too early for the best fall flowers and too late for the spring ones, and we had to note the former in bud and the latter in fruit, but we saw enough to know that the region was well worthy a thorough exploration at different seasons. The wildest, most unfrequented

parts of it we did not even reach, as they were too inaccessible for our limited time, but what we heard of them made us expect great things.

We noticed five well defined classes into which it would be possible and convenient to divide the flora of this region.

I. First there is the flora of the sand hills and plains bordering upon Lake Michigan. The whole neighborhood of this lake appears strange to one who is not accustomed to the enormous deposits of sand resulting from the melting of the great glacier. This sand occurs in some places hundreds of feet thick, piled up into huge hills, swept out into steep valleys, so white that the reflection of the bright sunlight from it soon becomes painful, and so fine that it is the most fatiguing labor to walk in it. Clinging to this uncertain, shifting soil some plants find a precarious living. The sand hills seem perfectly bare except as they are covered here and there by clumps of shrubs and stunted growths of *Pinus Strobus*. The shrubs are *Ceanothus Americanus*, *Hamamelis Virginica*, *Rhus copallina*, *R. Toxicodendron*, *Quercus nigra* and a *Juniperus*. The first herb noticed and collected was *Campanula rotundifolia*, L., var. *linifolia*, Gr., with very rigid leaves and rooting deep into the sand. Then there were *Arabis lyrata*, *Tephrosia Virginiana*, *Krigia Virginica*, *Monarda punctata*, *Lithospermum hirtum*, and more abundant, *Saponaria officinalis*, *Lespedeza hirta*, *Œnothera biennis*, *Asclepias tuberosa*, *Euphorbia corollata*, etc. Among the sedges and grasses we found *Cyperus Schweinitzii*, *C. filiculmis*, *Carex Muhlenbergii*, *Poa compressa*, and *Kœleria cristata*. The only fern noted was *Pteris aquilina*. The flora of these sands is meager but well defined, for we found very few of the species mentioned in other localities. Of course it is not meant that they are all only found upon sand hills, for some of them we have collected in Southern Indiana, but such seemed to be their habit in this region.

II. The second division is the flora of the wet grassy meadows and choked-up swamps. Such regions we always found a short distance from the lakes, evidently former prolongations of their beds. We studied them principally a few miles south of Otis, and south of LaPorte, which lies upon a cluster of beautiful lakes. The only shrubs we noticed in the conditions just described were *Rhus glabra*, *Spiræa salicifolia*, *Rosa blanda*, *Ribes rubrum*, *Cephalanthus occidentalis*, *Viburnum prunifolium*, and *Salix humilis*. Among the herbaceous phænogams were *Elodes Virginica*, *Epilobium coloratum*, *E. palustre*, var. *lineare*, *Lythrum alatum*, *Cicuta bulbifera*, *Sium lineare*, *Coreopsis trichosperma*, with leaves so slender that they resemble those of *C. rer-*

ticillata, *Cacalia tuberosa*, *Campanula aparinoides*, *Scutellaria galericulata*, *Typha latifolia*, *Sparganium eurycarpum*, *Alisma Plantago*, *Asclepias incarnata*, *Saururus cernuus*, etc. Of other families we found *Eleocharis palustris*, *Eriophorum Virginicum*, *Rhynchospora alba*, *R. glomerata*, *Carex scoparia*, *Zizania aquatica*, *Spartina cynosuroides*, *Bromus ciliatus*, *Osmunda regalis* and *Woodwardia Virginica*. Of *Epilobium palustre* we noticed two forms that seemed constant and easily distinguished. In the first the flowers were smaller, always white; the leaves very much crowded, narrowly linear, 1½–2 inches long, 1 line wide; the whole upper part of the plant whitened. In the second the flowers were larger, pink or rose-color; leaves 1–1¼ inches long, 2–3 lines wide. Of course the differences are only such as may occur in all species, but both forms are certainly necessary to make a complete specimen. The differences seem to become less when we come to analyze them and subject them to measurement, but there is an indescribable something that always enables us to distinguish them at a glance.

III. The flora of the lakes proper. To one who has never botanized upon small lakes there is something very fascinating in his first ride in a "dug-out," coasting along reedy banks and among floating leaves, crowding through choked channels where every dip of the oar brings up dense masses of underwater vegetation. Such trips can be best taken at Laporte, where boats can be had at any time and where the lakes are full of plants. Probably the most noticeable growth there is *Pontederia cordata* with its tall spikes of violet-blue flowers rising in endless succession along the shores. Then there is an abundance of *Nuphar advena* and *Nymphæa odorata*, though we searched our Nymphæas in vain for any fragrance. They were as scentless as could be. We peered anxiously for tubers, but no tubers could we find, and it had to stand as *N. odorata*. Then there was *Brasenia peltata*, *Sagittaria graminea* with leaves varying from ovate-lanceolate to filiform, *Ranunculus aquatilis*, var. *stagnatilis*, *Schollera graminea*, *Potamogeton compressus*, *Anacharis Canadensis*, *Myriophyllum spicatum*, *Utricularia vulgaris*, etc. Along the low sandy shores we picked up *Hypericum Canadense*, var. *major*, *Hydrocotyle umbellata*, *Stachys hyssopifolia*, *Juncus pelocarpus*, *J. acuminatus*, *Dulichium spathaceum*, *Scirpus Smithii*, *Eleocharis acicularis*, etc. Up to these lakes formerly extended the growth of the prairies that lie farther south and it is still found in old neglected fields and along the lines of railroads, but the rest has been so long under cultivation that the indigenous flora has disappeared. Hence

any mention of the numerous prairie forms we found in the conditions just indicated will be made under the head of prairie flora.

IV. The flora of the tamarack and sphagnous swamps. These swamps are found along the Kankakee, but chiefly in north-eastern Indiana. The one we examined was near Kendallville, on the L. S. & M. S. R. R. If one is delighted with his first botanical trip upon a lake, he can scarcely be less so with his first experience in a tamarack swamp, with the dark branches of *Larix* above his head and a soft cushion of *Sphagnum* under his feet. It is in such places that I think we will find our rarest forms and I regretted exceedingly that our visit lasted but one day. We noticed that three species of moss chiefly covered the ground, viz: *Sphagnum squarrosum S. cuspidatum* and *Leucobryum glaucum*. Growing abundantly upon these moss banks was *Drosera rotundifolia*, and each gland upon the delicate leaves had exuded a clear drop of fluid that glittered like a dew-drop, showing how beautifully appropriate is the name "sun-dew." Then there was *Sarracenia purpurea, Elodes Virginica, Campanula aparanoides, Calopogon pulchellus, Cypripedium pubescens, C. acaule, Smilacina bifolia, Osmunda regalis*, etc. We found several bushes of *Betula pumila* which seem to be intermediate between *B. pumila* and *B. glandulosa*. The leaves are glandular dotted and there are many resinous, wart like glands upon the glabrous branchlets; but the bushes were 6 or 8 feet high and the leaves pale beneath with finely reticulated veinlets. Around the edges of the swamp, in wet ground, before the tamarack begins, we noted *Clematis Virginiana, Potentilla fruticosa, Cornus stolonifera, Aster longifolius, Cnicus muticus, C. discolor, Lobelia Kalmii, Salix candida, Scirpus validus, Carex comosa, C. flava*, etc.

V. The prairie flora. The prairie of Indiana is found in a tier of counties farther south and the flora is as well defined as that of the lakes. Here thrive principally the large and coarse *Compositæ* and some peculiar *Leguminosæ*. To tell of all the plants we found upon the prairies or that had extended from them along the railroads, would take up too much space and I can mention only the best marked. There were *Linum sulcatum, Petalostemon violaceus, P. candidus, Amorpha canescens, Guara biennis, Eryngium yuccæfolium, Liatris scariosa, L. spicata, L. cylindracea, L. pycnostachya, Solidago stricta, S. rigida, S. Missouriensis, S. gigantea, Silphium laciniatum, S. terebinthinaceum, S. integrifolium, Parthenium integrifolium, Rudbeckia subtomentosa, Lepachys pinnata, Helianthus latiflorus, H. occidentalii, H. mollis, H. giganteus, H. grosse-serratus, H. divaricatus, H. hirsutus, Co-*

reopsis palmata, Cacalia tuberosa, Verbena stricta, Asclepias verticillata, Acerates longifolia, A. viridiflora, Juncus nodosus, var. *megacephalus*, etc.

Some good species have been omitted as belonging strictly to none of the divisions made but rather a mixture of all and brought together by artificial conditions, as along the railroads. For instance, between Laporte and South Bend we found, in addition to very many of the species just mentioned as belonging to the prairie region. *Anemone cylindrica, Helianthemum Canadense, Lechea major, Polygala polygama, Lupinus perennis, Astragalus Canadensis, Potentilla argentea, Vaccinium Pennsylvanicum, Seymeria macrophylla, Gerardia flava* (with leaves in every case decidedly acute), *G. pedicularia, Ruellia ciliosa, Apocynum androsaemifolium, Habenaria virescens, H. ciliaris, Tofieldia glutinosa, Allium cernuum*, etc. In a ditch were collected *Lemna polyrrhiza* and both species of *Wolffia*.

In the streets of Goshen we found *Borrago officinalis*, L., looking as though it had taken up its abode permanently, though of course we could not tell. There was an old garden near by from which it had undoubtedly escaped but probably was not established sufficiently to entitle it to a place in our flora.

In conclusion, I would request that all botanists of Indiana, or those who have worked in Indiana, communicate with me in regard to the catalogue of the state flora, that it may be made as full and complete as possible upon the first issue.—J. M. C.

Potato Pierced by Grass.—A case of this is given in the Gazette for December. The past season I found two tubers in one hill pierced by stems of *Poa pratensis*. I mention this because some people still doubt that such a thing can take place. I have no doubt quick-grass is often carried from one farm to another where it has grown into potatoes. The growing point of the stems of quick-grass and June-grass are quite sharp and stout.—W. J. Beal, *Lansing, Mich.*

The Botrychia not Ferns.—In nearly all the botanies now in use, the species of *Botrychium* and *Ophioglossum* will be found included among the Ferns, arranged either at the commencement or close of that family under the head, Sub-order *Ophioglossaceæ*. Hooker, in his "Synopsis Filicum," makes the same arrangement although in "Species Filicum," published previously, he omits them altogether, as not coming within the province of that work. Until very recently, but little was to be found written upon these interesting plants on this side of the water, and even the descriptions in the American botanies are very meager, and do not always in-

clude the full number of species to be found within the limits of the territory which these works are intended to include.

Of the nine species of *Botrychium*, acknowledged by Milde in his monograph of the genus, we are fortunate in being able to find six (possibly seven) in this country. Within a year, "Botrychium simplex" and "Vernation in Botrychiums," by Geo. E. Davenport, and description of most of the species of *Botrychium* in the "Ferns of North America," by Prof. D. C. Eaton, have made their appearance, adding much of value to the literature of the subject as far as the American species are concerned. Yet we are still obliged to seek among foreign authors information concerning their structure, the position of the *Ophioglossaceæ* in the vegetable kingdom and their relations to other nearly allied plants.

In Sachs's "Text Book of Botany" are to be found the results of the later investigations regarding the structure, mode of growth, and method of reproduction of the class *Ophioglossaceæ*, which includes three genera only, viz: *Ophioglossum*, *Helminthostachys* and *Botrychium*. If we examine any of the native species of *Botrychium* when they are first developing their fronds, we shall find at the outset that, unlike the Ferns, which are circinate in their mode of vernation, the *Botrychia* develop their fronds from the ground in an erect position, and if the base of the plant is examined under the microscope, the buds for several succeeding years will be found one below another, still in an erect position, the rudimentary sterile and fertile fronds in the most highly developed buds clasping each other. This mode of growth is the same with all the plants of the class *Ophioglosseæ*.

As far as is now known, the growth of the prothallus from the spore takes place under the ground: at least this is the case with those plants in this class of which the prothallus has been observed. The prothallus is very small, not over 2 mm. in diameter, has but few root hairs, and is destitute of chlorophyll; while with the true Ferns the prothallus is often 6 or 7 mm. in diameter, has a profusion of root hairs, contains much chlorophyll, and develops above the ground. In fact the Ferns have a much greater thalloid exhistance in every way than the *Ophioglossaceæ*. The spores of the Ferns are in cases, which are developed from the outer layer of cells of the frond, and are therefore to be considered as trichomes. The spores of the *Ophioglossaceæ*, on the contrary, are derived from the inner tissue of the fertile spike or frond which bears them, and therefore cannot be referred to trichomes, but, as Sachs suggests, more strongly resembles the produc-

tion of pollen in the anthers of flowering plants. These very important differences between the Ferns and the *Ophioglossaceæ*, require us to place them in separate classes of equivalent value.

As the *Equisetaceæ* are in some respects more highly differentiated than the ferns, they must therefore be placed in advance of them in the system of classification; yet both the Ferns and Equisetums have an extensive thalloid exhistance, and therefore must be placed below the *Ophioglossaceæ*, which in turn having only one sort of spores, as have also the Ferns and Equisetums, must remain with them in the isosporous division of vascular cryptogams, in position nearest the heterosporous division, where male and female prothalli are developed from different spores of the same plant, and thus suggest the stamens and pistils of flowering plants.

It is not intended to offer here anything more than a mere suggestion as to the position occupied by the *Botrychia* (*Ophioglossaceæ*) in a general classification; but as the interest increases in the collection of our American species, it will be required, where information can be obtained regarding them.

It should be known more generally by collectors that *Ophioglossum* and *Botrychium* are not true ferns, and that they should be looked upon rather as fern allies, for they differ from the Ferns more than the Equisetums, and as much as most Lycopods.—JOHN ROBINSON. [*Science News, Dec. 15.*]

A REPLY.—We are exceedingly sorry if the pages of the GAZETTE have been the means of causing hard feeling between some of our Iowa botanists. In the September number we published a communication from Mr. J. C. Arthur, author of the Catalogue of the Iowa Flora, in which he replied to certain statements that had been published in reference to his Catalogue. We have a reply from the Rev. Rob't Burgess claiming that we have not treated him fairly in not publishing some of his communications in which he had corrected the mistakes that had been made. Of course, if we have thus failed to do Mr. Burgess justice, we are ready to right it as far as we can, and for this purpose we publish some of the statements of his letter.

"A criticism upon my Botanical Reports, in the September GAZETTE calls for a brief reply. The writer charges to my account two articles in the GAZETTE and *Bulletin*, for the publication of which I am not responsible. Mr. Arthur, ignorant of the fact that I had sent a correct report to the GAZETTE (unpublished) to rectify and replace them, says that "barely 1-5 of all my analyses were correct. [This is a mistake, as there is no such

statement in the article referred to. Mr. Arthur says that "over a fifth were incorrectly named."—EDS.] I printed three reports, 75 plants in all, in which I admit 5 false analyses, with a few doubtful." We readily concede that the fault is all our own in ever having admitted for publication species that were doubtful and hence we are ready to receive all the fulminations of the parties and will trouble the readers of the GAZETTE with no more of it.—EDS.

FERNS OF NORTH AMERICA, Parts 10 and 11.—This work continues of the same excellence and when completed will give us as beautiful and elaborate a monograph upon our Ferns as we could desire. As a general rule the figures are all excellent, so that even an ordinary observer would be able to recognize and determine almost any fern he would find. The present parts contain *Osmunda regalis*, L., *O. Claytoniana*, L., *O. cinnamomea*, L., *Aspidium Thelypteris*, Swartz, *Polypodium vulgare*, L., *P. Californicum*, Kaulf., *Scolopendrium vulgare*, Smith, and *Lomaria Spicant*, Desvaux. All the figures impress us more favorably than that of *Osmunda regalis*. It is unlike any form of that species that grows here and we were compelled to read the name before knowing what it was. Our royal fern should make a more impressive picture. Besides there is not that sharpness and distinctness of outline that marks most of the other figures, as *Aspidium Thelypteris* for instance, or the two species of *Polypodium*.

NOTE.—For the fantastic mistakes that appeared in the December number of the GAZETTE, our readers will please not hold us responsible. They were due to the conceit of a printer, whose knowledge of botany is somewhat limited.

WE would call attention to the advertisement of H. Eggert, Esq., of St Louis, Mo. The plants he offers for sale are remarkably cheap, but that does not imply that they are remarkably poor. Many of the species are exceedingly rare and the specimens are complete and fine, among the very best we have ever received. When a botanist can select fine specimens of his desiderata for four cents a species, he had better avail himself of the offer. Mr. Eggert has an abundance of plants and will send a list of them to any one upon application.

WE begin to publish in the next number a very interesting series of papers from Mr. A. H. Curtiss upon the flora of the shell islands of the Florida coast.

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BOTANICAL GAZETTE.

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A Visit to the Shell Islands of Florida, by A. H. Curtiss.—Paper I.—On the eastern coast of Florida there are extensive grassy marshes stretching from the Everglades northward, with more or less interruption, to Georgia. These are separated from the ocean by islands and by long sand bars connecting with the mainland. The St. John's river is bordered with these marshes for several miles from its mouth. Through them and between the sea-islands and main land of Georgia travelers reach Florida by the "inland passage." This passage enters the river within sight of its mouth and between a group of islands called "The Sisters." These islands, like many others of smaller size which are scattered through the marshes, are composed entirely of oyster shells. Though the same species of mollusk now abounds in these waters, it is difficult to imagine what agency led to their accumulation into such vast mounds, rising abruptly from the marshes to a height of from five to twenty feet and sometimes covering a square mile in area. The Sisters are three in number, about equidistant, similar in size and readily suggest the name they bear. The appearance of these islands, their large size and apparent inaccessibility, the luxuriant vegetation covering a seemingly impenetrable soil, naturally excite the curiosity of passing tourists but it is evident that their botanical features were unknown previous to 1878, during which year the writer made frequent visits to them, and found them to be as marked in botanical as in geological features and as regards entomology, incomparable. It is a unique region, a land flowing with honey and gall, in which one may enjoy much and suffer much. With this, a foretaste, we invite the reader to accompany us mentally (the more comfortable way) on a tour of inspection.

Sailing down the lake-like St. John's till we emerge from the treacherous waters of the "middle-marsh" we behold on our right the bold promontory called St. John's Bluff, rich in historical associations and in growths of *Ceratiola* and *Ximenia*, vast marshes to the left, and far ahead the dim shaggy outlines of the Sisters. A favoring breeze speeds us toward them; one by one the intervening miles are counted out, and presently we are skirting the outlying marshes of the largest, called Pine-Island. The banks in places are firm and brist-

ling with oysters, in others broken down and submerged by recent storms. Creeks cut them at intervals, leading, no one knows where. One inlet in particular, our boatman calls the "Mouth of Hanamile," which leads to the "Pepper Islands." Through the Mouth and down the throat of the passage we go, and soon reach the retreat of the fiery *Capsicum*. The banks are steep and composed wholly of bleached oyster shells which slip under our feet and throw us against the points of the "Spanish Bayonet," *Yucca aloifolia*, which almost entirely covers the island. Bleeding from its punctures we scale the parapet and look around. Bayonets bristle and interlock on every hand. There are shrubby growths of *Sageretia*, *Forestiera porulosa* and *Quercus virens*, with rigid spine-like branches and bloated Opuntias warning us to touch not. Climbing over these formidable plants and binding them together, is found that singular vine, the *Vincetoxicum scoparium*, Gray. Its tough, twine-like, green and almost leafless stems intertwine among neighboring plants like a *Cuscuta*. A dozen or more of these stems often twist together into a rope, run over to another branch or bush and separate again. If one cuts his way through the tangle each severed end reminds him that he is dealing with a member of the milk-weed family. It bears a profusion of minute yellowish flowers and the pods are as slender as the branches. The sister species, *V. palustre*, Gray, grows in saline marshes, twining in long spirals up the terete leaves of *Juncus* and *Fimbristylis*. The slender, half-shrubby *Capsicum frutescens* grows here in abundance, finding support for its straggling branches among shrubs of stouter growth. It closely resembles the southern, shrubby growth of *Solanum nigrum* except in fruit, which is red and apparently the same as the "Bird-pepper" sold by druggists. The fruit ripens throughout the year and birds gather it. The *Forestiera*, like its cousin *Chionanthes*, is a slender tree with similar fruit but inconspicuous flowers and meager foliage. Perceiving a clump of these trees laden at the top with ripe fruit we decide to climb for it, although the heat is intense. After much cutting of tangled vines and Bayonet points we reach the sought for fruit and find that the heat has so blistered it that the blue pulp has almost entirely disappeared, leaving the stones clean and yet firmly attached to their peduncles.

Leaving this inhospitable isle, a short sail brings us to 'Possum Island. Like the one just visited it is composed entirely of shells, but the vegetation is quite different. The characteristic plants of this are not boldly repellant as in the other, but of a deceptive, treacherous nature, armed with worse but partially concealed weap-

ons. I doubt if such an assemblage of execrable plants is to be found in so small a space elsewhere in the whole world. Hidden among the grass is the *Opuntia Pes-Corvi*, its slender, creeping joints armed with long, sharp spines, which inflict a most painful wound, the barbed points holding on so tenaciously that the joints of the cactus break off with them. It is a plant not to be handled with impunity—much less to be sat upon. Of the large *Opuntia vulgaris* there is also an abundance. It is armed with fascicles of minute, stinging spines which seem to have a much stronger attachment for ones hand than for the parent plant. Here are also barricades of Spanish Bayonets, tangles of spring vines, beds of Spanish needles and stinging nettles. But worst of all is the *Mentzelia Floridana* or "Poor Man's Plaster." It is as handsome as a primrose and as incapable of giving pain, yet one soon comes to dread it more than the *Yucca* or *Opuntia*. It is a weak, diffusely branching plant, reclining on the ground and on other plants, and adorned with bright yellow flowers similar to those of a cactus. Its leaves are extremely pretty and change as they fade to various shades of yellow and brown. A weary, unwary tourist is tempted to recline upon the soft mats of herbage it spreads so invitingly, but woe to him if he yields to the temptation, for upon rising he finds himself clothed like Joseph in a coat of many colors, gorgeous with patches of yellow, orange, russet and every shade of green. Each leaf that touches him has stuck like an adhesive plaster and is not to be removed by pulling or scraping. The whole plant is covered with a pubescence consisting of minute, white, barbed, siliceous hairs, and as the leaves are very tender it is almost impossible to detach them from a woven fabric.

The resources of this islet are soon exhausted, and the excessive heat constrains us to betake ourselves to the water again. There is no shade and the shells seem to give out as much heat as the sun itself, producing a temperature of fully 150 degrees. Once again floating between walls of living green, thoughts of sunstroke are supplanted by anticipations of rest and pleasure within the inviting groves of Pine-Island to which we now draw near. Our journey has been thus far a purgatorial passage to—perhaps—a botanical paradise. We shall soon know if our boatman finds the right channel through the marshes and that before the tide ebbs. (To be continued.)

Carbonic Acid in the Air of Forests.—The information has come to us that Prof. Ebermayer and Dr. Schwappach find that the air

within an extensive forest contains, in summer, almost double the proportion of carbonic acid in the air over the open country. On the other hand, forest soil is in summer very much poorer in carbonic acid than the soil of the open fields and the amount in the latter rises with elevation of temperature much more rapidly than does that in the former. The diffusion of carbon in the soil seems to be slow, as its quantity appears to vary greatly in places close to each other.

The Phyllotaxis of Leaves, by A. P. Morgan, M. D.—1. The arrangement of leaves upon the stem is denominated *phyllotaxis*. Leaves are arranged upon the stem in three principal ways; (1) they are *alternate*, (2) they are *opposite*, (3) they are *verticillate* or *whorled*. Leaves are alternate upon the stem when but a single leaf grows at each node. Leaves are opposite when two leaves grow at each node upon opposite sides of the stem. The leaves are verticillate or whorled when more than two leaves grow in a circle or whorl around each node of the stem.

I. *Alternate Leaves.*—2. Alternate leaves are arranged upon the stem in a succession of spiral *cycles*. The length of each cycle is determined by the distance from any one leaf to the leaf directly above it upon the stem. The cycle is represented by a fraction of which the numerator denotes the number of times the spiral winds around the stem, and the denominator indicates the number of leaves in the cycle.

3. The various arrangements of alternate leaves are designated in accordance with the numbers of their vertical ranks upon the stem; these are always the same as the number of leaves in the cycles.

4. It has been ascertained that with rare exceptions the cycles in the various arrangements of alternate leaves are represented by the series of fractions;

1-2, 1 3, 2-5, 3-8, 5-13, 8-21, 13-34, &c.

It is here proposed to amend this series by placing at its beginning 0-1. In this series the numerator of each fraction after the first two is obtained by adding the numerators of the two preceding fractions, and the denominator is obtained by adding their denominators.

5. The series 0-1, 1-2, 1 3, 2-5, &c, represents the different cycles of arrangement when we follow the shortest path around the stem. If we go around in the opposite direction, by the longest route, the series will be, 1-1, 1-2, 2-3, 3-5, 5-8, 8-13, 13-21, 21-34, &c., in which each fraction is the complement of the corresponding fraction in the preceding series.

6. *The 0-1 Cycle.*—The 0-1 cycle applies only to the simplest of Phænogams, such as *Lemna* and *Wolffia*; there is but one leaf and no spiral. It represents the primeval marchantioid frond, the common ancestor of all Monocotyledons. Probably no plant rising to any height has a stem with *monostichous* or one-ranked leaves.

7. *The 1-2 Cycle.*—In the 1-2 cycle the spiral makes one turn and bears two leaves. The 3d leaf stands directly over the 1st, the 4th over the 2d, etc.; the odd numbers being ranged on one side of the stem and the even numbers on the other. The leaves are *distichous* or two-ranked. Each leaf is 1-2 the circumference of the stem or 180 degrees distant from the preceding leaf. Examples of this mode of arrangement are to be found in the alternate leaves of the Elm and of Grasses.

8. *The 1-3 Cycle.*—In the 1-3 cycle there are three leaves on one turn of the spiral. The 4th leaf stands directly above the 1st, the 5th above the 2d, the 6th above the 3d, etc. The leaves are *tristichous* or three-ranked. Each leaf is at a distance from the preceding leaf equal to 1-3 the circumference of the stem or 120 degrees. The Alder and Sedges furnish examples of tristichous leaves.

9. *The 2-5 Cycle.*—The 2-5 cycle is the most common of leaf arrangements, and may be observed in most Exogenous plants, as the Cherry, Poplar, etc. The 6th leaf stands directly over the 1st, but is not reached until the spiral has wound twice about the stem. Hence the leaves are *pentastichous* or five-ranked. The angular divergence of the leaves is 2-5 the circumference of the stem, or 144 degrees.

10. *The Higher Cycles.*—In the 3-8 cycle, the leaves are eight-ranked and the angular divergence is 135 degrees. In the 5-13 cycle the angular divergence of the leaves is 137 degrees plus a fraction. Hence the series 0-1 1-2, 1-3, 2-5, 3-8, 5-13, 8-21, 13-34, &c., being infinite, it constantly approximates to some mean value lying between 1-2 and 1-3; the successive cycles being alternately larger and smaller than the mean value, and the difference of their angular divergences continually growing less and less. No two leaves of a cycle are ever farther apart than one-half the circumference of the stem or nearer together than one-third of its circumference.

11. Hence it is that in the higher cycles it becomes difficult to trace the spiral arrangement of the leaves, and to distinguish their vertical ranks. For example, the difference between the 5-13 and 8-21 arrangement is only 1-273 of the circumference of the stem, the difference between the 8-21 and 13-34 arrangement is 1-714 of the circumference. It is evident that a very slight irregularity of growth

will render the exact order of superposition uncertain. And cases no doubt occur in which each leaf stands alone in its own vertical rank and the arrangement is what is termed *curviserial*. Such a cycle may be marked ∞-∞; the angle of divergence is such that it is not possible to divide the circumference by it, and hence no leaf can be placed exactly above another.

12. Nevertheless, we are enabled to mark the succession of the leaves and thus to determine the order of their arrangement, by means of the *secondary* spirals. In every cycle after the first two, there are one or more orders of parallel secondary spirals. These pursue an oblique direction between the primary generating spiral and the vertical ranks to which it gives rise. If we mark the alternate leaves of any axis in the order of their succession, beginning with the lowest, by the series of natural numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, &c., we may exhibit the primary and secondary spirals and the vertical ranks of the different cycles as follows:

a. The 0-1 cycle. (Fig. 1.) 1 vertical rank, 1, 2, 3, 4, 5, &c.

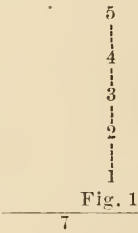

Fig. 1.

b. The 1-2 cycle. (Fig. 2.) 1 spiral of the 1st order, 1, 2, 3, 4, 5, &c.; 2 vertical ranks, 1, 3, 5, 7, 9, &c., and 2, 4, 6, 8, 10, &c.

c. The 1-3 cycle. (Fig. 3.) 1 spiral of the 1st order, 1, 2, 3, 4, 5, &c.; 2 spirals of the 2d order, 1, 3, 5, 7, 9, &c., and 2, 4, 6, 8, 10, &c.; 3 vertical ranks, 1, 4, 7, 10, 13, &c., 2, 5, 8, 11, 14, &c., and 3, 6, 9, 12, 15, &c.

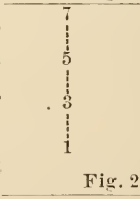

Fig. 2.

d. The 2-5 cycle. (Fig. 4.) 1 spiral of the 1st order, 1, 2, 3, 4, 5, &c.; 2 spirals of the 2d order, 1, 3, 5, 7, 9, &c., and 2, 4, 6, 8, 10, &c.; 3 spirals of the 3d order, 1, 4, 7, 10, 13, &c., 2, 5, 8, 11, 14, &c., and 3, 6, 9, 12, 15, &c.; 5 vertical ranks, 1, 6, 11, 16, 21, &., 2, 7, 12, 17, 22, &c., 3, 8, 13, 18, 23, &c., 4, 9, 14, 19, 24, &c., and 5, 10, 15, 20, 25, &c.

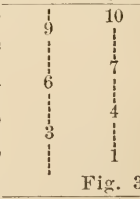

Fig. 3.

e. The following table exhibits the successive orders of spirals in each cycle as far as the 13-34 cycle. The signs + and – indicate the direction of the spirals to the right or left of the vertical line, as compared with the direction of the primary generating spiral.

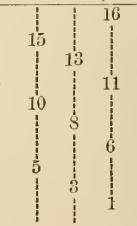

Fig. 4.

13. From a consideration of the origin and de-

TABLE I.

C	I	II	III	IV	V	VI	VII
0–1	0						
1–2	+1						
1–3	+1	−2					
2–5	+1	−2	+3				
3–8	+1	−2	+3	−5			
5–13	+1	−2	+3	−5	+8		
8–21	+1	−2	+3	−5	+8	−13	
13–34	+1	−2	+3	−5	+8	−13	+21

velopment of the spirals in these cycles, we deduce the following two fundamental principles:

I. *Every cycle contains within itself in the form of spirals all the vertical ranks of the preceding cycles.*

II. *The consecutive orders of spirals mount one above another alternately to right and left till finally they reach the vertical ranks.*

14. As consequences of these two principles we may infer as follows:

a. The system begins with 0-1.

b. Every cycle discloses the preceding cycles of the system.

c. The number of spirals in the successive orders is the same as the denominators of the fractions which represent the system.

d. The spirals of the 1st, 3d, 5th, &c., orders have the same oblique direction to the right or to the left. The spirals of the 2d, 4th, 6th, &c., orders have the same oblique direction to the left or to the right, cross-wise of the spirals of the odd orders.

e. The common difference of the numbers in the series which represent any order of spirals is the same as the number of spirals in the order.—[To be continued.]

HELIOPSIS VS. HELIANTHUS.—Probably there are few botanists, especially of the less experienced ones, who are not deceived, at times, in regard to *Heliopsis lævis*, Pers. Even after studying *Heliopsis* and noting its peculiarities, it is still easy to mistake it. Its external appearance is so similar and yet its structure is so different from any *Helianthus* that we wonder how it was possible to be so completely deceived. Were this the case only with myself, it would be nothing remarkable, but I have heard other and more experienced workers speak of the same trouble. It certainly is very exasperating to take considerable pains to obtain neat specimens, lay them carefully in papers, and then find when you reach home that you have collected *Heliopsis* instead of some new *Helianthus*. The polymorphous nature of this species makes it the more difficult to recognize. In the typical form I have found the stem often glaucous and the leaves nearly smooth. The var. *scabra* has the leaves and often the stem

scabrous. This form is the largest. Intermediate between these, there is a small form with smooth stem and scabrous leaves. Of course these all run into each other, so that we may expect anything from a glaucous to a scabrous stem, variously combined with smooth, rough or scabrous leaves. So much for appearance. When we look at the structure of the heads there is little similarity. Compare the two:

	Heliopsis.	*Helianthus.*
Rays	pistillate	neutral.
Receptacle	conical	flat or convex.
Chaff	linear-lanceolate	broad, embracing the achenia.
Pappus	none	two or four deciduous scales.

Keeping these points in mind there will be no trouble in recognizing *Heliopsis* at once. In dried specimens I find a peculiarity belonging to this species that does not seem to be possessed by any *Helianthus*. In the former the base of the rays is a deep orange color, shading off to light orange at the top. The back or outside of the ray florets is much lighter than the inside, becoming a straw yellow. These shades seems to be constant and exist in all my specimens, which, considering the universality of the species, are entirely too numerous. I do not find this shading to be present in any of the *Helianthi*. This presents an obvious means of distinguishing between the two and the presence of this coloring should at least lead us to suspect the identity of the species in question.—C. R. Barnes, *Madison, Ind.*

Cross-Fertilization in Lobelia syphilitica.—In an article upon "Certain Contrivances for Cross-Fertilization in Flowers," published in the American Naturalist for January, Prof. J. E. Todd gives the following very interesting account of the arrangements for the cross-fertilization of *Lobelia syphilitica*, L.

The corolla is monopetalous and two lipped, the lower lip consisting of three petals and the upper of two. Between the latter is a slit extending to the base of the tube. The five stamens are free from the corolla and united, their anthers and upper parts of the filaments forming a tube; or it may be said, the anthers combining, form a common cell for the pollen, which opens by a pore at its apex. On the lower margin of the pore are many short, stiff hairs, which at first project across the pore closing it, but when the pollen is ripe they turn abruptly downwards and leave it open. There is only one pistil, which is armed near the end of the style with a collar of short stiff hairs, similar in size and character to those on the anthers just

mentioned. The end of the style with its hairs forms the bottom of the pollen-cell before described. We have, therefore, the stigma shut up with the pollen in the same cell. "A capital arrangement for *self*-fertilization," one says. Nay, not too fast! The stigma is composed of two fleshy lobes, its receiving surface being on their inner surface And they are firmly closed together, so that the end of the pistil looks like a closed mouth with its lips firmly pressed together. With its bristly collar it reminds one of Jack-in-a-box, with an unusually "stiff upper lip."

This combined pistil and stamens is S-shaped, and when the flower opens, it springs through the slit of the corolla and stands with the tip of the pollen-cell just behind the upper lip of the corolla. Sometimes there is no trace of the stamens seen from the front; but if an insect tries to enter, the slit between the petals opens, the hairs of the anthers strike his back, and as he forces his way in, they produce a jarring of the pollen-cell which freely sprinkles the pollen upon him.

As the pollen escapes it is kept up to the pore by the pressure caused by the gradual lengthening of the style. The hairy collar acting like a swab, sweeps the cell clean. When all the pollen is gone, the style, continuing its growth, pushes the stigma through the pore and forward through between the upper petals. The end of the style then comes downward, the lips of the stigma open and roll back as though turning inside out. This exposes the whole surface of the stigma to be covered with pollen from the back of the first insect which comes from a flower discharging pollen. So the cross-fertilization is beautifully accomplished.

Fungoid Friends and Foes.—In the twenty-ninth annual report of the Regents of the University of the State of New York on the New York State Museum of Natural History, the report of the Botanist, Chas. H. Peck, contains the following interesting facts:

Nearly three hundred species of fungi that attack and inhabit living plants have been detected in the State (New York).

They affect almost as many species of flowering plants. In some cases several parasites attack the same host plant; in others, one parasite attacks two or more host plants indiscriminately. But, in many instances, a single parasite is peculiar to a single supporting plant, in which cases the latter may be taken by the student as a guide in his search for a description of the former. A Puccinia found on the leaves of the dwarf cornel, *Cornus Canadensis*, is almost certain to

answer to the description of *Puccinia porphyrogenita*, and an Æcidium on the leaves of the barberry, *Berberis vulgaris*, will scarcely be any other than *Æcidium Berberidis*.

A fact of still greater moment is, that some of our cultivated plants are attacked by fungoid foes which, minute as they are, materially diminish their vigor, impair their useful products and, in some instances, even destroy their vitality. Raspberries are attacked by the American raspberry rust, *Uredo luminata;* pea vines, by the pea mildew, *Erysiphe Martii;* oats and wheat, by the grain smut, *Ustilago Carbo;* plum and cherry-trees, by the black-knot, *Sphæria morbosa;* and lettuce and onions by their respective molds, *Peronospora gangliformis* and *Peronospora Schleideniana*. Such fungi must be regarded as injurious to the interests of the husbandman, nor is the pecuniary loss which they occasion trivial or inconsiderable. The loss produced by the potato mold alone, *Peronospora infestans*, abundantly warrants all the effort and study that have been devoted to the investigation of the history of the fungus and to the discovery of some efficient means for preventing its attacks or overcoming their destructive consequences.

On the other hand those fungi that infest noxious weeds and hinder their dissemination and multiplication, must be regarded as the friends and allies of man. Thus the thistle rust, *Trichobasis suaveolens*, an early state of *Puccinia Compositarum*, sometimes attacks the Canada thistle with great virulence, and so impairs its vigor as to prevent the development of the seeds, thereby checking the propagation and spread of this pestilent plant. So, also, the troublesome bur-grass, *Cenchrus tribuloides*, is sometimes infested by a smut fungus, *Ustilago Syntherismæ*, which not only prevents the development of the seeds of the grass but also of the annoying bur-like involucres. It may yet be found practicable to keep down this grass by the artificial dissemination of the spores of its parasitic fungus in those light sandy soils where the grass usually abounds. It certainly is desirable that the life histories of these fungoid friends and foes should be better understood than they now are, and that the means of multiplying or diminishing their numbers according to their characters should be under the control of the farmer.

New Species of Fungi, by Chas. H. Peck.—The eight species of fungi here described were collected by Mr. T. S. Brandegee and communicated to me by Mr. E. A. Rau. The quotations are from the notes of Mr. Brandegee.

PUCCINIA GRINDELIÆ.—Spots pale, orbicular, one to three lines in diameter, sometimes confluent; sori amphigenous, minute, crowded, black or blackish-brown; spores variable, oblong, obtuse or obtusely pointed, strongly constricted at the septum, .0016–.002 of an inch long, .0008–.001 broad; pedicel hyaline, equal to or exceeding the spore in length.

Radical leaves of *Grindelia squarrosa*. Colorado. "Not common." The variability of the spores is quite noticeable. In some the septum is wanting, in others the pedicel is attached to the side of the basal cell, a peculiarity sometimes seen in the spores of *P. variabilis*.

PUCCINIA CLADOPHILA.—Sori numerous, cauline, orbicular elliptical or oblong, sometimes confluent, surrounded by the ruptured epidermis, blackish-brown; spores subelliptical, scarcely constricted, obtuse, .0012–.0015 of an inch long, .0008–.0009 broad; pedicel very short.

Stems of *Stephanomeria minor*. Colorado. "On but one individual, although the plants are common." The branches sent were abundantly infested with the fungus. No leaves accompanied the specimens, so that I am unable to say whether they are ever attacked or not.

UROMYCES PLUMBARIUS.—Sori amphigenous, scattered or subconfluent, at first covered by the epidermis and of a peculiar shining leaden hue, at length exposed and of a dark ferruginous-brown or blackish-brown color; spores obovate or subelliptical, obtuse or rarely very bluntly pointed, .0009–.0012 of an inch long, about .0008 of an inch broad; pedicel very short or obsolete.

Leaves of *Œnothera cæspitosa*. Colorado. "Not common." The beautiful metallic hue of the covering epidermis is suggestive of the specific name.

UROMYCES BRANDEGEI.—Spots none; sori scattered, rarely slightly confluent, prominent, orbicular elliptical or oblong, black; spores subglobose or broadly elliptical, rough with minute warts or papillæ, .0012–.0016 of an inch long, .0011–.0015 broad; pedicel hyaline, usually equal to or exceeding the spore in length.

Leaves of *Boutelona curtipendula*. Colorado. "Common." This is a fine species, very distinct from *U. Graminum*. It is with pleasure that I dedicate it to its discoverer.

UROMYCES SIMULANS.—Sori epiphyllous, varying from subrotund to linear, often crowded and subconfluent, ferruginous-brown; spores variable, subglobose, obovate or elliptical, rather large, minutely rough, .0013–.0016 of an inch long, .001–.0011 broad; pedicel about equal to or shorter than the spore in length, easily separating from it.

Sheaths and upper surface of leaves of *Vilfa*. Colorado. In the character of the sori this species resembles *Puccinia Graminis*, from which, however, it differs in its paler ferruginous-brown color. The mature spores easily separate from the pedicels, in which respect the fungus simulates species of *Trichobasis*.

Uromyces sanguineus.—Spots small, scattered, sometimes confluent, bright-red or purplish-red; sori scattered, one on each spot, prominent, cinnamon-brown, often partly concealed by a single large fragment of the ruptured epidermis; spores obovate or oblong-pyriform, .001–.0016 of an inch long, .00065–.0008 broad, generally uninucleate, easily separating from the pedicel; pedicel hyaline, equal to or less than the spore in length.

Leaves of *Berberis Aquifolium*. Colorado. The deciduous pedicels connect this species with the genus *Trichobasis*, but I find an occasional one that is persistent, which, with the *Uromyces*-like appearance of the spores, induces me to refer the species to the genus *Uromyces*.

Cronartium Comandræ.—Peridium elongated, subcylindrical, more or less curved, slightly swollen at the base, yellowish or bright orange; spores subglobose, .0003–.0004 of an inch in diameter.

Stems of *Comandra pallida*. Colorado. A paler form of what appears to be the same species occurs on the leaves of *Comandra umbellata*, but I have not seen it fertile. The fungus surrounds the stems on all sides with its bright-colored bristling peridia.

Æcidium gracilens.—Spots thickened, green or slightly discolored; peridia hypophyllous, elongated, slender, pink or rosy-red, white when evacuated; spores globose, bright-orange, .0009–.001 of an inch in diameter, with a thick hyaline epispore.

Leaves of *Philadelphus microphyllus*. Colorado. "Not common." The pinkish hue of the peridia when filled with spores is very beautiful.

Some Missouri Ferns.—I have found *Asplenium parvulum* growing abundantly along the cliffs of the James River in this county (Greene), also *Adiantum Capillus-Veneris* in the same locality.—E. M. Shepard, *Springfield, Mo*

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NOTES ON BAPTISIA, by Wm. M. Canby.—Under the generic names of *Crotalaria* or *Sophora*, Linnæus described four genuine species of *Baptisia*, viz: *B. perfoliata*, *B. alba*, *B. tinctoria* and *B. australis*. In 1788, Walter added two more, *B. lanceolata* and *B. villosa*, placing them doubtfully under *Sophora*. Michaux (1803) placed all under *Podalyria*, and gave the same number (six) if we exclude his *P. mollis* which is now well known as a *Thermopsis*. Pursh merely copied Michaux's account of the species. Nuttall in his "Genera" published in 1818 added *B. leucophæa*, properly placing all under *Baptisia*. He continued Michaux's species as *B. mollis*, as did also DeCandolle in 1825 and Torrey and Gray, doubtfully, in 1838–40. DeCandolle added no new species, Muhlenberg's *B. bracteata* being the same as *B leucophæa*, Nuttall; but between his account of the species and that of Torrey and Gray, Nuttall had added his *B. microphylla* and *B. sphærocarpa* and Croom his *B. simplicifolia*, thus bringing the number up to ten. Torrey and Gray elaborated the genus well, clearing up some doubtful cases and adding two species of their own, *B. leucantha* and *B. Lecontii*, and one of Chapman's, *B. megacarpa*. The number was increased to fourteen by the *B. Serenæ* of Curtis, although this may yet prove to be a hybrid between *B. alba* and *B. tinctoria*; and as it is evident from a comparison of original specimens, that Mr. Watson is right in considering Ravenel's *B. stipulacea* as identical with *B. microphylla*, this number continued to represent the species, until, in the GAZETTE for August last, *B. sulphurea* was added by Dr. Engelmann and *B. calycosa* by myself, completing the list as given below.

The earliest arrangement of the species was by dividing them into the obvious groups of simple leaved and trifoliate leaved species. As the number of the latter increased the color of the flowers was brought into service to form sub-divisions. This did pretty well when the known species were fewer and the legumes of several had not been collected; but now that new species have increased and old ones have become better known it seems best to try if they cannot be more naturally grouped. The synopsis given below is the result of some study of the larger collections in this country supplemented

by the favors of esteemed correspondents. But as it is quite astonishing how rarely the legumes are found in our herbaria, an alternative arrangement based upon the color of the flowers is given for the last nine species. But this I do not regard with favor.

It is evidently natural and even necessary to retain the primary divisions of simple leaved and trifoliate leaved species, but to these I have added another for *B. microphylla*, Nutt., which is intermediate in character. In the TRIFOLIATÆ it is more convenient to form the principal divisions by bringing together species having bibracteolate pedicels as distinguished from those without them; and again to separate the latter into those species whose inflorescence is terminal and sometimes leafy, and those in which the racemes are pedicellate and opposite the leaves—a distinction which seems to me to be not only useful but of some importance; and the latter again by means of the legumes. This arrangement brings the allied species together better than any other that I could think of. If space permitted, the alliances of some of the species would present interesting features; but I will only add that specimens from the South and South-west will still be gratefully received and may serve to illustrate some doubtful forms.

BAPTISIA, Vent.

§ SIMPLICIFOLIÆ. Leaves all simple; no stipules (stipules and leaflets united).

1. *B. simplicifolia*, Croom. Leaves sessile or nearly so; flowers in racemes. Quincy, Florida.

2. *B. perfoliata*, R. Brown. Leaves perfoliate; flowers axillary. South Carolina and Georgia.

   var. *lobata*. Leaves variously sinuate or lobed or even almost trifoliate. South Carolina. (Ravenel.)

§§ STIPULATÆ. Leaves mostly trifoliate, but some of the upper leaflets and even the conspicuous stipules either suppressed or united together, thus appearing simple and sessile. Flowers in short loose terminal racemes.

3. *B. microphylla*, Nuttall. (*B. stipulacea*, Ravenel. I cannot but regret the necessity for the suppression of Ravenel's excellent name.) South Carolina and West Florida to Alabama.

   var. *axillaris*. Flowers axillary from the upper leaflets. Probably a hybrid. Aiken, South Carolina. (Ravenel.)

§§§ TRIFOLIATÆ. Leaves petioled, all trifoliate; flowers in racemes.

* Pedicels slender, bibracteolate above the middle; stipules, bracts and bracteoles persistent.

4. *B. Lecontii*, Torr. and Gray. Pubescent; calyx lobes short triangular. Georgia and Florida.

5. *B. calycosa*, Canby. Glabrous (except the somewhat ciliate foliage, &c.), calyx lobes foliaceous, almost as long as the corolla, persistent and enlarging in fruit. Legumes compressed, ovate, acuminate, about the length of, or shorter than the calyx. East Florida. (Miss Reynolds, Miss Floyd.) A very remarkable species.

** Pedicels not bibracteolate.

+ Racemes very many, short and loose, terminal, often leafy at base, *i. e.*, some of the lower flowers axillary.

6. *B. tinctoria*, R. Brown. Very smooth with small (½ in. to 1½ in. long) wedge obovate leaflets and small bright yellow flowers. Canada to Florida and west to the Mississippi.

7. *B. lanceolata*, Elliott. Stout, pubescent when young, leaflets oblanceolate (2 to 3 in. long); flowers large, dull yellow. North Carolina to Florida and westward.

var. *uniflora*, Torr. and Gray. (*B. uniflora*, Spreng.) Leaflets more cuneate obovate, firmer in texture, often retuse; flowers nearly all axillary. Arkansas.

+ + Racemes fewer, opposite the leaves, the flowers therefore never axillary.

++ Legume spherical, its walls very thick and bony.

8. *B. sphærocarpa*, Nuttall. Arkansas and Texas.

++++ Legumes oblong, the walls thin but firm.

= Legumes flattened contrary to the septa.

9. *B. alba*, R. Brown. Legumes six to eight times longer than broad; flowers white. North Carolina to Florida and westward.

10. *B. Serenæ*, M. A. Curtis. Legumes one half shorter; flowers bright yellow. Sand hills, South Carolina.

=== Legumes much inflated, blunt, nearly cylindrical.

11. *B. megacarpa*, Chapm. Racemes short, somewhat numerous, sometimes appearing as if terminal; flowers bright yellow; leaflets of the long petioled leaves elliptical. Florida and Georgia.

12. *B. leucantha*, Torr. and Gray. Racemes few, very long; flowers nearly white; leaves short petioled with oblanceolate leaflets; stipules deciduous; style short, about as long as the linear acute ovary. Upper Canada to Michigan and thence to South Carolina and Florida and westward.

13. *B. sulphurea*, Engelm. Nearly as in the last but with shorter racemes, persistent stipules and yellow flowers which have an obtuse ovary with longer style. Arkansas.

===== Legumes boat shaped, abruptly and sharply acuminate.

14. *B. villosa*, Nuttall. Racemes somewhat declining or erect; flowers yellow, short pedicelled; legumes little inflated, obtuse at base. Virginia, North Carolina and Arkansas.

15. *B. leucophæa*, Nuttall. Racemes strongly declined; flowers cream-colored, on long pedicels subtended by large persistent bracts; legumes much inflated, strongly acuminate at each end. Michigan, south to Texas and east to South Carolina.

var. *lævicaulis*, Gray. Smaller in all its parts and nearly smooth. Texas.

16. *B. australis*, R. Brown. Smooth; racemes many or several, erect; flowers blue or sometimes chocolate-colored with the vexillum sometimes auriculate; legumes erect, long and little inflated. Pennsylvania and Ohio to Georgia and Arkansas.

var. *minor*, Torr. and Gray. "Flowers smaller and fewer; vexillum not auriculate." Arkansas.

For the last nine species this arrangement may be preferred by some:

= Flowers yellow.
8. *B. Serenæ*, M. A. Curtis.
9. *B. megacarpa*, Chapm.
10. *B. sphærocarpa*, Nutt.
11. *B. sulphurea*, Engelm.
12. *B. villosa*, Nutt.

== Flowers white or cream-color.
13. *B. leucophæa*, Nutt.
var. *lævicaulis*, Gray
14. *B. leucantha*, Torr. and Gray.
15. *B. alba*, R. Brown.

=== Flowers blue.
16. *B. australis*, R. Brown.
var. *minor*, Torr. and Gray.

A Visit to the Shell Islands of Florida, by A. H. Curtiss.—Paper II.—Taking up the thread of our narrative where lately it was dropped, we find ourselves at the entrance of the channel which, through "wide-spread, reedy fens," leads to the Island of Pines. The tide is beginning to run out, and warns us to hasten or remain stranded somewhere in the morass till midnight. Rowing is impossible, but by pushing and paddling, we manage to get along very well through the broader reaches of the watery alley. All goes well for a while, but presently the creek forks and we know not which way to turn. The left-hand course appears more navigable, and soon we are toiling through a ditch which becomes narrower as we progress. It winds to the right and then to the left, and folds upon itself like a writhing

serpent, wandering, as it were, without aim or purpose, like one bewildered. Standing up in the boat and looking over the grassy plain, we report to those sitting: "We are approaching the island." "It is on our left." "It is behind us." A quarter of an hour passes, and the report is: "We are evidently receding from the island and must have taken the wrong course." A brief consultation follows and we decide to go on. Already we have pushed the boat over shallows with difficulty, and the tide is falling rapidly. The channel becomes narrower and several times the boat is turned with great difficulty by pushing bow and stern from opposite directions. At one point we are only an oar's length from where we were ten minutes before. Gradually we near the shore and at last only one elbow remains to be turned. But it is impossible to get the boat around this until the tide rises, and so leaving it tied to the rushes we make our way ashore as best we can. The steep white bank is surmounted by Bayonets and Cactuses which present a forbidding front, and rising from among these a few dead and weather beaten Cedars stretch forward their gaunt, white branches as if to forbid our approach. However we make the landing in safety, climb the ascent and after passing these grim sentinels, suddenly enter a verdant shady avenue. Live Oaks, Palmettos and Cedars border the way and cast a refreshing shade. Their branches are garlanded with vines and fringed with the Spanish moss. The thread-like *Vincetoxicum* dangles from the dagger-shaped leaves of a towering *Yucca*, and gathering themselves into a coil unwind again in the top of a spiny *Sageretia* or a drooping *Sapindus*. Huge plaited Palmetto leaves rustle as we pass. The *Cocculus Carolinus* and *Passiflora suberosa* grow in endless profusion, forming banks of richest verdure and carpeting with their Ivy-like leaves the pavement of white shells. Of shrubs the most noticeable is the *Chiococca racemosa* and *Psychotria rufescens*. Both are allied to *Coffæa* and the former bears a considerable resemblance to it. The branches are slender and flexuous, the leaves lanceolate and shining; the small bell-shaped flowers are borne in drooping axillary racemes and are succeeded by berries of snowy whiteness whence the generic name, which means Snow-berry. The berries of the Coffee shrub are red. The *Psychotria* is a little shrub not more than a foot in height with cymes of scarlet berries among clusters of shining green leaves. The *Chiococca*, *Vincetoxicum*, and several other plants found on these islands were, previous to our visit, ascribed to South Florida. Growing in the deepest shades we find a delicate little plant of unique aspect, somewhat resembling in texture and shape of leaves the

Sedum ternatum, but yet not traceable to any known genus of United States plants. Not until its filiform spikes of minute flowers are found, can we even guess at its identity. Then we exclaim exultantly, *Peperomia!* Upon tasting it the warm, aromatic flavor of the favorite condiment is at once perceived. It is a congener of the Black Pepper, a most interesting addition to our flora and will be a companion for the hitherto isolated *Saururus*. As we reach the border-land of shadow and sunshine we meet a number of plants of quite a different character, plants which beside the stately and elegant species just visited, might be called plebeian, or in common parlance, weedy. Here is the Black Nightshade comparing notes with its cousins, *Capsicum* and *Physalis*. Here too are some gigantic *Phytolaccas*, likewise with a company of relatives, *Rivina*, *Boerhaavia* and *Petiveria*. The Poke-weed calls for no description. No verse was ever dedicated to it, though many verses have been written with its juice. Looking at it from a poetical point of view, we would call it a plant of a peculiarly modest and retiring disposition, blushing to its very roots at the thought of its bare, awkward shape, and drooping its flowers as though it would be where the *Arbutus* traileth. Dealing with it practically, we apply axe and grubbing hoe to every plant we find, for here in Florida it becomes a small tree and an unsightly object. The *Rivina* is a straggling, half-shrubby plant, with cinereous foliage and racemes of small, delicate, pink flowers and scarlet berries. The *Petiveria* much resembles *Polygonum Virginianum* in general appearance and has the odor of Garlic. We have now reached a large clearing, which, since denuded of trees, has become a natural garden, filled with a great variety of luxuriant and beautiful plants. The most conspicuous of these is the *Verbesina sinuata*, a large and showy Composite which contrasts well with the more delicate herbage. Morning-glories of various colors grow here in astonishing profusion, and when seen in the early morning their beauty is indescribable. There are three species, *Ipomœa commutata* with delicate leaves and purplish flowers, *I. Michauxii* with coarse foliage and white flowers and *I. hederæfolia* with flowers of azure blue. There are large beds of *Mentzelia*, brilliant with golden flowers, spreading mats of *Commelyna communis* with delicate blue flowers, and here and there covering a shelly mound we find the delicate *Melothria pendula* or "Rabbit Cucumber" with curious green fruit hanging from hair-like peduncles. Every stump is hidden under vines of *Cocculus, Bignonia, Gonolobus* and *Smilax*. Lending grace to the scene are a variety of beautiful grasses, the gracefully drooping

Uniola nitida, the stately *Setaria Composita*, and, carpeting the ground, the delicate *Panicum hirtellum*. To a naturalist no garden could be more beautiful. Art could only improve it by opening paths among its tangled mazes. Having crossed the clearing we find ourselves suddenly in a very dark and humid forest. Here there is scarcely any herbage except ferns and even these grow sparingly. Innumerable vines of the Grape and *Gonolobus*, of the prickly *Smilax*, and serpentine *Berchemia*, seek the tree tops and obstruct the way. In an opening there is a fine growth of a Vetch, similar to *V. tetrasperma*, which Mr. Watson has named *V. Floridana*. With this exception nothing of interest rewards our search. It is a dismal region and we are glad to hasten back to the sunshine and to the boat which is now well afloat. The island may have untold treasures in reserve, but the price demanded is too great. Physical suffering outweighs intellectual enjoyment and we decide that the limit of endurance has been reached. For twelve hours or more we have fought an invisible foe, and at last we succumb to a minute winged particle of matter called the sand-fly. The coast of Florida would be a naturalist's paradise but for the sandflies, deerflies and mosquitoes (large and small) which infest it. But if only one of these pests might be removed let that be the sand-fly. Its strength consists chiefly in its littleness, as it penetrates any but the most closely woven fabric. It crawls through the hair and beard and into the eyes, nose and ears, biting where it goes until its victim is almost maddened and compelled to build a fire and take refuge in its smoke. Such a scourge might have driven our first parents from paradise. Evidently persons have attempted to make this island their home but have been obliged to abandon it. Gladly we step into our boat again and push from the shore, and, after again turning a hundred right angles, it is with a sense of relief that we shoot out into the free rolling waters of the St. John's. Sailing past that portion of the island which is covered with Pines we next seek the entrance to Stratton Island, the second in size of the group. It is with comparative ease, yet with "many a winding bout," that we effect an entrance through the marshes which environ it. Climbing its steep, shelly banks, we follow a path well trodden by fishermen, leading along a narrow ridge with steep sides, which becomes rugged and precipitous as we advance. The shells slip under our feet, low-branching, gnarled, and lichen-clad trees render progress difficult, and after advancing nearly half a mile, we turn back, but not until we have discovered two fine growths of the *Cheilanthes microphylla*, a fern not before found in the United States except on

the borders of Mexico, where it is said to have been collected many years ago. It is similar to *C. vestita* but smoother and more delicate, intermediate between that and *C. Alabamensis*. Here we also find the *Eugenia monticola*, a low shrub with handsome coriaceous leaves having the strong aromatic flavor of Allspice, which is the fruit of the *Eugenia pimenta*. Another new find is a stout, entire leaved form of *Ipomœa hederæfolia*, which Prof. Gray has called var. *integriuscula*. We also find growing in abundance on this ridge, the *Psychotria, Sageretia* and *Forestiera* before mentioned. The last two flower in the fall and fruit in the spring. Here likewise are the *Frangula, Clematis Catesbyana, Urtica chamædryoides, Parietaria debilis, Stellaria prostrata*, etc. The variety of surface and vegetation is truly wonderful. Stepping down from the ridge we are all at once surrounded by a strictly littoral vegetation, such as *Baccharis, Borrichia, Statice* and *Sesuvium*. Following the base of the ridge we come to a small swamp filled with sedges and Solidagos. Upon turning to the right we enter the very ideal of a tropical forest, one of natures cathedrals, grand and awe-inspiring, full of objects strange and beautiful from the "lordly king of Palms to the lichen which staineth its stem." Huge trunks and leaves and countless vines festooned from tree to tree circumscribe the vision, while over our heads the gigantic leaves of the Tree Palmetto form a majestic canopy. On the ponderous branches of Live Oaks are luxuriant growths of ferns, and streaming down from branch and branchlet, the Grey Moss hangs motionless, adding solemnity to the scene. What is there in nature so exquisitely beautiful as the long Grey Moss of these southern forests? In its ever undulating lines of growth are embodied the "lines of beauty and of grace." Whether hanging motionless from lofty branches like stalactites in a cave, or writhing in the wind like the Gorgons' tresses, it has a beauty peculiarly its own, magical and weird. It seems out of place among its surroundings and better fitted for the land of the fairies where plants might be expected to have, like this, grey foliage and green flowers, and to grow downward and feed on thin air.

As we have advanced into the gloomy depths of the forest, the sun has sunk low, and as it disappears below the horizon, the shades of night gather in the dark recesses and seem to people them with unseen presences. Unperceived vines grapple us as we hurry along; everything we touch seems to awaken the echoes. The great leaves of the Palmetto that hang like curtains in our way, rustle as we press them aside, while the dead and fallen ones crackle loudly beneath our tread. Thoughts arise of bloody traditions connected with this

region, of massacres by the Spanish, French and Indians who for centuries disputed the soil; of a whole garrison left hanging on the trees, if not on this, on some neighboring shore. Excavations are found at frequent intervals of every shape and size, said to have been dug by people who were searching for hidden treasures. Emerging from the forest we soon reach a blazing camp fire, and after partaking of the supper prepared for us, we spread our rubber blankets on a mattrass of cedar boughs, unroll bedding and erect a mosquito canopy.

A threatening thunder cloud has passed away, and the stars are shining brightly. A soothing sound of whispering breezes and lapping waters mingles with the ocean's deep diapason. The air is cool and refreshing. We hope for a good night's rest and in the morning to start for the sea-beach.—(To be concluded.)

New Species of Fungi, by Chas. H. Peck.—Specimens of the species of fungi here described have been received from the various sources indicated.

Agaricus chlorinosmus.*—Pileus convex or expanded, warty on the disk, covered on the even margin with a light powdery at length evanescent substance, white; lamellæ white; stem nearly cylindrical, stout, deeply penetrating the earth; spores broadly elliptical, .0003–.0004 of an inch long; odor distinct, chlorine-like.

Plant six to seven inches high, pileus four to six inches broad, stem one to two inches thick.

Burnt ground in woods. Closter, N. J. August. *C. F. Austin.*

I have seen only a single dried specimen but the characters are so striking and peculiar that there can be no difficulty in identifying the species. The large size, the peculiar odor and the powdery substance on the margin of the pileus, which according to Mr. Austin's notes is nearly half an inch thick, are characters not easily overlooked. Because of the warty disk I should refer the species to the subgenus *Amanita*, yet no volva was detected. No trace of an annulus is visible in the dried specimen and the stem having been cut from the pileus it is not clear whether the lamellæ were free or not.

Agaricus Morgani.—Pileus fleshy, soft, at first subglobose, then expanded or even depressed, white, the brownish or alutaceous cuticle breaking up into scales except on the disk; lamellæ close, lanceolate, remote, white, then green; stem firm, equal or tapering up-

*Since reading proof, the Torrey Bulletin for December has come to hand containing a description of this species furnished by Mr. Austin, without the author's knowledge.

wards, subbulbous, smooth, webby-stuffed, whitish, tinged with brown; annulus rather large, movable; flesh both of the pileus and stem white, changing to reddish and then to yellowish when cut or bruised; spores ovate or subelliptical, mostly uninucleate, .0004–.0005 of an inch long, .0003–.00032 broad, sordid green.

Plant six to eight inches high, pileus five to nine inches broad, stem six to twelve lines thick.

Open dry grassy places. Dayton, Ohio. *A. P. Morgan.*

This species is remarkable because of the peculiar color of the spores. No green-spored Agaric, so far as I am aware, has before been discovered, and no one of the five series in which the very numerous species of the genus have been arranged, is characterized in such a way as to receive this species. The subgenus *Lepiota*, to which our plant clearly belongs in every respect except in the color of its spores, pertains to the Leucospori or white-spored series. This series is characterized as having "spores white, rarely whitish," the whitish, (albidæ) as explained by Fries, including such spores as have the color sordid or inclining to reddish, (sordidæ l. in rubellum vergentes). Nothing is said about green spores. Shall we then institute a green-spored series (Viridispori) for the reception of this new Agaric? It is not yet shown that such a series exists in Nature, although this plant may be an indication of it, and it seems a little hasty to found a *series* on the strength of a single species. Until other species of such a supposed series shall be discovered it seems best to regard this as an aberrant member of the white-spored series. The same course has been taken with those Agarics that have sordid or yellowish or lilac-tinted spores. In this view of the case our plant is readily referred to the first section (*Proceri*) of the subgenus *Lepiota*, and should, in my opinion, stand next to *Agaricus molybdites* in which the lamellæ are said to become blue.

It gives me great pleasure to dedicate this fine species to its discoverer, Mr. Morgan, who has kindly submitted to me a description and figure of the fresh plant, from which description and figure the preceding diagnosis was chiefly derived. In the dried specimens the lamellæ have assumed a dull brownish-green hue.

Merulius sulcatus.—Thin, fleshy or subcoriaceous, effuso-reflexed; pilei narrow, imbricated and subconfluent, concentrically sulcate, villose, wavy, whitish varied with yellowish and brownish tints, the extreme margin white when young; hymenium pallid, tinged with brownish or pinkish hues, concentrically sulcate, gyrose-reticulate with crowded folds.

Dead bass wood. Sheboygan, Wisconsin. *J. J. Brown.*

Lycoperdon Frostii.—Peridium subglobose, one to two inches broad, generally narrowed below into a short stem-like base, echinate or shaggy with long stout whitish spines which are generally curved or stellately united and which at length fall off and leave the peridium brown and smooth; capillitium and spores purplish-brown; spores globose, rough, .00016–.0002 of an inch in diameter, intermingled with numerous short slender fragmentary filaments.

Ground in meadows. Brattleborough, Vermont. August and September. *C. C. Frost.*

This species is related to *L. constellatum*, but the spines are longer and of a paler color and the denuded peridium is smooth, not reticulated as in that species. It is respectfully dedicated to its discoverer.

Hypomyces Banningii.—Subiculum white, then sordid; perithecia crowded, ovate, with a papilliform ostiolum, pale amber or honey color; asci slender, cylindrical; spores uniseriate, oblong fusiform, white in the mass, .0012–.0015 of an inch long, .00016–.0002 broad.

Decaying fungi, apparently some *Lactarius*. Baltimore, Md. *Miss M. E. Banning.*

The spores in the specimens are simple, but they may possibly become uniseptate when old.

Some Florida Ferns.—In the Torrey Botanical Bulletin for September, 1877, I reported *Acrostichum aureum*, L., as growing twenty miles south of St. Augustine; and *Polypodium Plumula*, H. B. K., fourteen miles from St. Augustine, and also at Daytona on the Halifax River. Here I also found *Adiantum Capillus-Veneris*, L.

About St. Augustine I collect *Blechnum serrulatum*, Michx., *Polypodium aureum*, L., *P. incanum*, Swz., *Vittaria lineata*, Swartz, *Pteris aquilina*, var. *caudata*, *Woodwardia angustifolia*, Smith (which fruits freely here), *W. Virginica*, Willd., *Asplenium ebeneum*, Aiton, *Aspidium patens*, Swartz, *A. Floridanum*, Chapm., *Onoclea sensibilis*, L., *Osmunda regalis*, L. and *O. cinnamomea*, L. These ferns fruit finely here, the latter sometimes two or three times a year.—Mary C. Reynolds, *St. Augustine, Fla.*

N. A. Ferns.—Mr. Geo. E. Davenport has now in the hands of the printer his Catalogue of North American Ferns. It is a work that every fern lover in the United States should have, and we hope that the readers of the Gazette will encourge Mr. Davenport in this undertaking and promptly send on their names as subscribers. Copious

notes have been added, giving the geographical range, and an extra sheet has been prepared for use as a check list. It will be a pamphlet of 50 pages or more and will really be more of a hand-book than a mere catalogue. Mr. Davenport's address is Medford, Mass.

JOURNAL OF BOTANY, British and Foreign.—The first article is a notice with figures, by S. LeM. Moore, of the Royal Herbarium Kew, of a monstrous monandrous *Cypripedium*. It leads to a discussion of other deviations from the usual structure of *Cypripedium*, one of which was observed by Dr. Asa Gray. The inference is that the diandrous is an earlier type than the monandrous,—"that some type probably extinct at the present time, containing stamens of the two whorls and *Cypripedium* pollen was the starting point of the order" A note by Dr. Marten on the structure of Composites, in further confirmation of the theory, that the pappus is not a true calyx but a series of *trichomes* rather than definite *phyllomes*. Description of new plants from China and from Persia. In the proceedings of the Linnean Society of London, Nov. 7, 1878, Dr. Maxwell Marten read an extract from a letter of Dr. Beccari, describing a gigantic Aroid, found by him in Sumatra. The species which he calls *Conophallus Titanum* has a tuber five (5) feet round, from which is pushed up a single leaf, with a long stout petiole, the divided blade covering an area of forty-five (45) square feet.—A. P. M.

FRASERA CAROLINENSIS, Walt.—Drs. Gray and Chapman in their Floras disagree as to the duration of the life of this plant. Both, however, are wrong. The plant is not a biennial or triennial as Prof. Gray describes it, nor a perennial as said by Chapman in his Southern Flora, but is probably of uncertain duration, varying from 8 to 10 years and upwards. Three roots dug from the woods in Madison Co., Ill., in 1869, must have been several years old at the time. One fruited in 1875, one in 1876 and the last this year, 1878. The roots form each year a rosette of root leaves. When the fruiting stalk starts up in May it grows rapidly, and after the fruit is mature in July and August the root perishes.—E. HALL.

DR. MORGAN'S article on the Phyllotaxy of Leaves will be concluded in the April number.

BOTANICAL GAZETTE.

Vol. IV. APRIL, 1879. No. 4.

Ophioglossum palmatum, Linn.—A habitant of tropical America from Cuba to South Brazil, and also of the Isle of Bourbon in the Old World, this species was first detected within the limits of the United States by Dr. Chapman, and was published in his enumeration of new plants from the semi-tropical regions of Florida (Botan. Gazette, Vol. III, p. 20). It does not appear to have been met with by Dr. Garber, Mr. Curtiss, Mr. Shockley and others, whose recent collections in East and South Florida have added many species to the list of North American Ferns, and have verified to some extent the prediction, that the Everglades, if ever thoroughly explored, would contribute largely to our *Cryptogamiæ*.

It was my good fortune, in March, 1878, to come across *O. palmatum;* and the interest in finding it was enhanced by the fact that its discovery by Dr. Chapman had not at that time been published. The plant is probably quite rare, at least north of lat. 20 degrees, 40 minutes. In the course of an extended trip along the Gulf Coast region from Cedar Keys to Charlotte Harbor, and up the Caloosahatchee River, ninety miles, to its source near Lake Okeechobee, I observed this *pseudo* Fern in only one spot: a Palmetto swamp about a mile back from the north bank of the Caloosahatchee, some sixty miles above Punta Rasa, and about eight miles west-north-west from the old site of Fort Simmons. The locality seemed to offer no peculiar conditions, beyond the fact that it exhibited no traces of having been visited by fires. The only specimens found grew upon two *Sabal Palmetto* trees, fifteen to twenty feet from the ground, rooted in the axils and under the sheaths of the dead petioles—much after the manner of another epiphytal, a true Fern common in those parts, *Polypodium aureum*.

Omitting the characters of this species to be found in the descriptions of authors, the following details, chiefly supplemental, are taken from my specimens; and it is to be noted, that these are in every way smaller, and have fewer lobes and spikes, than the specimens described or figured from more tropical countries:

Rhizome thick, fern-like, producing 1–3 fronds, mostly without fruit; same root-stock sometimes bearing a persistent dead frond, a

green one with withered spikes of empty sporangia, another one with matured fruit, and a minute young frond; rootlets profuse, stout, forking dichotomously. Sterile segment undulate, divisions 1–4, sometimes forking once or twice, acutish, pendulous, sinuses wrinkled or plicate. Fertile segments or "spikes" 1–4, arising at intervals or clustered from the stipe, the basal margins, or the intramarginal lamina near the base of the sterile segment, recurved; peduncles 6 lines long, spikes 6 lines to one inch long and one line broad; sporangia 14–20 pairs.

The external structure of the frond in this species as also in *O. pendulum*, indicates the unity of the barren and fertile parts in *Ophioglossaceæ*, and that together they constitute a "branched leaf." (Sachs) This theory is in opposition to the earlier hypothesis of a cohesion of the two spikes of a barren and of a fertile frond. In *O. palmatum*, therefore, the highly developed frond may be described as branching into one barren, and numerous fertile, segments; the former again dividing into dichotomously forking lobes.

Branching thus like the horns of elks, and thick and fleshy in texture while living, this curious epiphyte has probably recalled to others as well as myself, the exotic Fern, which is often seen attached to the wall of conservatories, *Platycerium alcicorne*.

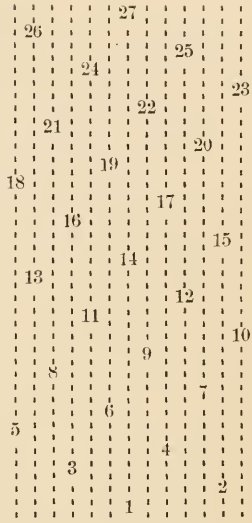
The species is so distinct from all its congeners, that Presl founded upon it a separate genus, which he called *Cheiroglossum*, in allusion to the resemblance of the sterile segment to a *hand*, and of the fertile ones to *tongues*.—John Donnell Smith.

Phyllotaxy of Leaves, by A. P. Morgan (concluded from Feb. Gazette).—15. The secondary spirals are of essential service in determining the arrangement of the leaves when they are thickly crowded upon the stem, as is the case with the leaves of the Houseleek and the scales of Pine Cones. The intermediate spirals are the most plainly to be seen; those adjacent to the vertical ranks and to the primary spiral are the most obscure. Having determined two consecutive orders of spirals, one winding to the right and the other winding to the left, the sum of their numbers of spirals gives the next higher order of spirals, and their difference gives the next lower order. The other orders of spirals may be determined in like manner until the primary generating spiral and the vertical ranks are reached.

16. A single example will illustrate the manner of finding the cycle by means of the secondary spirals. Take for example the cone of the White Pine (*Pinus Strobus*) (Figs. 5 and 6). The process of

finding the cycle may be divided into three parts.

I. *To mark the numbers upon the scales.* If we trace one set of spirals plainly to be seen winding to the right, we find they consist of three parallel lines of scales extending from the base to the apex of the cone. This gives us the common difference 3 (14. e.). In like manner from a set of spirals winding to the left, we get the common difference 5. Marking the lowest scale 1, we set off from it in one direction the series 1, 4, 7, 10, &c., and in the other direction the series 1, 6, 11, 16, &c. Then from 4, 7, 10, 13 as starting points, with the common difference 5, we mark parallel with 1, 6, 11, &c., the series of scales, 4, 9, 14, &c., 2, 7, 12, &c., 5, 10, 15, &c., and 3, 8, 13, &c. This numbers all the scales of the cone.



Figs. 5 and 6.

II. *To find the denominator of the cycle.* The number of the spirals in the two consecutive orders is 3 and 5; hence the number of spirals in the next higher order is 3x5=8 (14. c.). This order therefore consists of eight spirals parallel with 1, 9, 17, 25, &c. The sum of 5 and 8 is 13 and an inspection shows that the series 1, 14, 27, 40, &c., belongs to a vertical rank. There are therefore 13 vertical ranks, and the denominator of the cycle is 13.

III. *To find the numerator of the cycle.* If we trace the primary generating spiral 1, 3, 4, 5, &c., from the scale marked 1, we find that it makes 5 turns around the cone to reach the scale marked 14. This gives the numerator 5. Therefore the cycle is 5-13.

17. That the cycle of the cone belongs to the common system (0–1, 1–2, etc.) may be inferred from the number of spirals in the successive orders being 3, 5, 8, 13, (14. b. c.). The numerator 5 of the cycle may also be inferred from the second order of spirals preceding the vertical rank. The numerator of any cycle in the common system is always the same as the denominator of the second preceding cycle, and, consequently the same as the next higher order of secondary spirals.

18. The number of cycles in a Pine cone may be indicated by prefixing a multiplier to the fraction expressing the cycle. This will also show approximately the number of scales in the cone. Thus the cycle and number of cycles in a cone of Hemlock Spruce (*Abies Canadensis* is represented by 2 (5-13). This also shows that the number

of scales in the cone is 2x13=26. The number of cycles in the cones of Black spruce (*Abies nigra*) vary from 4 to 7, averaging about 5. Hence its cycle and the number of cycles will be represented by 5 (5–13), and the number of scales by 5x13=65. In like manner the cone of White Pine (*Pinus Strobus*) is represented by 5 (5–13); of Pitch Pine (*Pinus rigidus*) by 4 (13–34); of American Larch (*Larix Americana*) by 2 (2–5), etc.

TABLE II.

C	I	II	III	IV	V	VI	VII
	1	2	3	5	8	13	21
0–1	0						
1–2	1						
1–3	1	1–2					
2–5	2	1–2	1–3				
3–8	3	1	1–3	1–5			
5–13	5	3–2	2–3	1–5	1–8		
8–21	8	5–2	1	2–5	1–8	1–13	
13–34	13	4	5–3	3–5	1–4	1–13	1–21

19. Table II exhibits the number of turns or parts of a turn made by each order of spirals in a single cycle. Or, the denominator shows the number of cycles required for the spirals to make the number of turns indicated by the numerator.

Opposite Leaves.—20. Opposite leaves also exhibit cycles of arrangement analogous to those of alternate leaves.

21. *The 0–2 Cycle.*—(Fig. 7.) The 0–2 cycle represents the two-leaved ancestor of all Dicotyledons; it yet stands for the cotyledonary leaves of many of them, the succeeding leaves being alternate. The 0–2 cycle, however, is not at all liable to the objection of being an ideal one. "*In many fossil plants the pairs of leaves do not alternate, but are placed directly one over the other.*" (Henfrey's Elementary Botany, p. 45.) Hence 0–2 represents a two-ranked arrangement of opposite leaves.

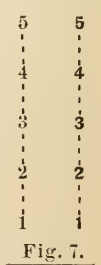


Fig. 7.

22. *The 1–4 Cycle.*—(Fig. 8.) In the case of opposite decussate leaves, the cycle is complete in two nodes. The leaves are borne upon two spirals, each of which makes half a turn round the stem. The cycle, therefore, is represented by 2(1–2)–2 (2)=1–4. This is the most common arrangement of opposite leaves. Examples are furnished by the Maple, and by plants of the Mint Order.

Fig. 8.

23. *The Higher Cycles.*—When the fourth pair of leaves stands directly over the first pair, three nodes complete the cycle and there are six ranks. There are two spirals each bearing three leaves in half a turn about the

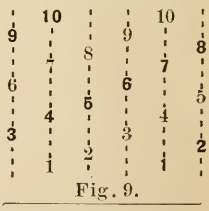


Fig. 9.

stem. This cycle then is represented by 2 (1–2) –2 (3)= 1–6. (Fig. 9.) In like manner it may be shown that the next cycle, in which the 6th pair of leaves stands directly over the first pair, is represented by 2 (1)–2 (5)=2–10. And it will be found that the cycles of opposite leaves are represented by the series, 0–2, 1–4, 1–6, 2–10, 3–16, 5–26, 8–42, &c.

24. The following table exhibits the number and direction of all the orders of spirals belonging to each cycle of opposite leaves, as far as the 13–68 cycle.

Fig. 10.

TABLE III.

C	I	II	III	IV	V	VI	VII
0–2	0						
1–4	+2						
1–6	+2	–4					
2–10	+2	–4	+6				
3–16	+2	–4	+6	–10			
5–26	+2	–4	+6	–10	+16		
8–42	+2	–4	+6	–10	+16	–26	
13–68	+2	–4	+6	–10	+16	–26	+42

25. Exceptional cones of Pine and Fir are to be met with, which belong to the higher cycles of opposite leaves. Fig. 10 is a cone of Black Spruce, in which the cycle is 5–26. The cycle of such a cone is to be determined in the same way as one belonging to the alternate system (16.), except that in numbering the scales the common difference is found by taking half the number of spirals in each order. It will be found that two sets of numbers are necessary to mark all the scales of the cone.

26. In like manner cycles of verticillate leaves when there are three leaves at each node will fall into the series 0–3, 1–6, 1–9, 2–15, &c. When there are four leaves at each node the series will be 0–4, 1–8, 1–12, 2–20, &c.

TABLE IV.

	ORDERS OF SPIRALS.						
SYSTEM.	I	II	III	IV	V	VI	VII
(0–1, 1–2)	+1	–2	+3	–5	+8	–13	+21
(0–1, 1–3)	+1	–3	+4	–7	+11	–18	+29
(0–1, 1–4)	+1	–4	+5	–9	+14	–23	

27. There is authority for examples of cycles in systems other than the common one.

Table IV exhibits three systems of cycles and the number and direction of their different orders of

spirals. The laws (13, 14) that govern the common system apply equally to any other. The mode of finding the cycle from the secondary spirals (15, 16) is also the same as in the common system.

28. The phyllotaxis of the leaves is generally uniform in the same species. Thus in the Oak the leaves are always alternate; in the Maple, they are always opposite; and in *Galium* always whorled. The cycle of the cone of Hemlock Spruce is always 5–13. The direction of the spirals does not appear to be uniform in the same species, but, in some individuals the spiral winds to the right, and in others it winds to the left. In the same individual plant, the spiral usually pursues the same direction upon the branches as upon the stem.

Flowers and Snow.—This season of the year calls to mind some observations concerning flowers and snow in Colorado.

Among the first flowers of spring, those that must live and bloom through many snow storms, are *Townsendia sericea, Sisymbrium canescens, Cymopterus glomeratus* and *montanus, Viola Nuttallii, Leucocrinum, Corydalis, Thlaspi,* &c. Last year the *Townsendia* was in blossom as early as Feb. 14th, and *Phlox canescens*, with many other flowers, by the middle of March. A number of plants are in bloom in April and covered every year by the spring snows. In May I have seen *Crataegus coccinea* white with flowers made still whiter by the damp snow, with *Astragalus* and *Vicia* and very many other plants in full bloom buried beneath a foot of snow.

The spring snows do not seem to injure the plants or flowers in the least and many of them are benefited by the increase of moisture.

A snow storm in June is said to have covered all the dry parks with sunflowers, *H. petiolaris* and *lenticularis.* The alpine plants growing where there is a frost nearly every night in the year, must be well able to stand the cold. In July I once saw a *Trollius laxus* in blossom, growing out from a hole about one foot in diameter, in the center of a large snow drift. As the snow drifts disappear the plants rapidly grow and blossom. Some of the drifts melt away much sooner than others, and plants growing there are much in advance of those inhabiting the place of late melting snows. On Mt. Ouray, above timber line, there is a slope which, in August, is beautifully covered with the large golden flowered *Ranunculus adoneus.* On one portion from which the snow early melted, the plants are almost out of flower; at another part they are in their greatest perfection, and in other parts they are in their youth, closely following up the retreating snow drift.

Late one September, after snow had fallen twice, I made two or three excursions up among the high summits of the Sierra Sangre de Cristo, and was surprised to find a great number of plants in blossom in shaded locations and under rocks where the snow had not melted away early enough in the summer so as to give them a good start. They seemed bound to live their life out even if they did have a hard time of it and it took a longer time than all summer. *Primula Parryi*, frozen in blossom, was growing under cascades among ice-covered rocks. *Aquilegia cærulea* full of flowers, was standing in snow. *Adoxa, Gentiana frigida, Erigeron, Saxifraga* and many others were caught in full bloom by the Alpine winter. During some winters an extraordinary amount of snow falls and drifting among the high peaks, the following summer may not be long enough and warm enough to uncover the plants growing beneath, and they may not even begin to grow that year. After a winter of little snow and small drifts soon melted away by a warm summer, barren ground that may not have seen light upon it for years, is uncovered and an ancient drift has a wide border of flowerless ground.—T. S. Brandegee.

The Distribution of the North American Flora, by Sir J. D. Hooker.—In the *American Naturalist* for March there is a reprint of this lecture delivered by Sir J. D. Hooker last spring before the members of the Royal Institution of Great Britain. It will be remembered that the lecturer visited the United States during the summer of 1877, and in connection with Dr. Gray made a botanical cross-section of the continent, noting particularly the geographical distribution of plants. The regular report of this survey will appear in the forthcoming eleventh report of the U. S. Geol. and Geog. Survey of the Territories, and until that report is ready for distribution we will have to be satisfied with such casual information as the distinguished authors choose to give us.

The lecture begins by stating the fact of the immigration of plants from one continent to another, and then proceeds at once to a consideration of the physical conformation of America and the effect it has had upon the distribution of plants.

In the United States the lecturer observes five well defined meridional belts of vegetation, viz: the great eastern forest region, extending from the Atlantic to beyond the Mississippi; the prairie region; the Rocky Mountain region; the Sink region, remarkable for its display of sage-bush and saline plants; and the Sierra Nevada region with its gigantic coniferous forests. The first region is very closely

allied in its species to Eastern Asia, a fact brought out not only by a similarity in common species or large genera, but in very many cases by peculiar species and genera represented by two species only, one in Eastern America, the other in Eastern Asia. In Western America there is no such resemblance, making a greater difference between the floras of the eastern and western parts of the United States than between Eastern America and Eastern Asia. In the west there is a large commingling of Mexican or Southern species that have crept northward, guided by the mountain ranges. Hence the conclusion is arrived at that the similarity between the species of Eastern America and Eastern Asia is explained by the continuity of the continents to the north in the Cretaceous or Miocene and a consequent commingling of species, and that the Glacial period drove these species southward along the two continents farther even than they appear now. With the retreat of the glacier and the return of a milder climate these plants would creep northward again, but the enormous height of the Rocky Mountain and Sierra Nevada regions would retain the glaciers there long after they had disappeared from the eastern half of the continent. When eventually these alpine glaciers did succumb to a milder climate, the old Asiatico-American species having either established themselves elsewhere or been driven into the sea towards the south, the field would be clear for the advance of the Mexican forms and we find them even up in British America. Hence to state it all in one sentence, our Eastern flora has come from the North and our Western flora from the South.—J. M. C.

Caucalis Antheriscus.—I have found thoroughly naturalized in the woods back of Cincinnati and remote from dwellings, *Caucalis Anthriscus*. The name was kindly furnished by J. W. Congdon. Prof. Watson, to whom I sent a specimen, informs me that the plant was found in 1872 by Judge G. W. Clinton, near Buffalo, N. Y. It is firmly established in this locality and promises, I think, to become a troublesome weed.—C. G. Lloyd.

Note on Panicum littorale, Vasey, by Gen. Wm. Munro.—Panicum littorale, Vasey, is undoubtedly *P. repens*, L.,—one specimen the dwarfish form which he described in the second edition of Sp. Plant. p. 87. It is absolutely identical with specimens which I have before me in DeCandolle's herbarium from Crete and Gibralter, where I have also collected it myself. It is also *P. arenarium*, Brotero.

There has always been considerable confusion about *P. repens*, L. The *P. repens* of Burman, Fl. Ind., p. 26, tab. 11, fig. 1 (1768), where

he quotes Linnæus, is quite different and, from the figure, is probably *P. prostratum*. At any rate it belongs to quite a different section of *Panicum* from true *P. repens*, L. However, many seem to have thought that this was the true *P. repens*, and therefore founded a new species under the name of *P. arenarium*. True *P. repens* can always be distinguished by the numerous nerves on the upper glumes and on the lower palea of the male flowers.

The specimen sent by Dr. Gray has quite glabrous vaginæ, whereas those received from Dr. Vasey have almost hirsute vaginæ.

Recent Publications.—*American Naturalist*, March.—Besides Sir Joseph Hooker's lecture, referred to above, Mr. Fred. Brendel writes a spicy article "On Nomenclature," much of which is true and some of which is impracticable, however desirable it might be. Mr. Geo. E. Davenport, in advance of the publication of his Catalogue of N. Am. Ferns, gives his reasons for retaining Tuckerman's name *Aspidium Boottii* in place of *A. remotum* of Braun.

Journal of Botany, British and Foreign.—Sketch of the life of Elias Fries with portrait. He was born in the south of Sweden, Aug. 15, 1794, and died Feb. 8, 1878. Report on a collection of Ferns from Borneo, with description of new species by J. G. Baker. Notes on some points in Botanical nomenclature by Mr. Bentham. On the Vegetable remains in the Egyptian museum at Berlin, by Alexander Braun, edited from the author's manuscripts.

Catalogue of Plants collected by Dr. Coues in Dakota and Montana by Prof. J. W. Chickering.—This catalogue contains 692 species, of which about 390 are found in New York or New England, about 80 are distinctively Western in their habitat, and about 215 belong on the plains and the Rocky Mountain region.

Ferns of North America, by Prof. D. C. Eaton. Parts 12 and 13.—In looking over the plates of this number it seems to us that they are the finest that have yet been given to us. There is a freshness and distinctness about them that leaves little to be desired. The species figured and described are *Aspidium acrostichoides*, Swz., *Pteris aquilina*, L., *Asplenium Trichomanes*, L., *A. viride*, Hudson, *A. parvulum*, M. & G., *Adiantum Capillus-Veneris*, L., *A. emarginatum*, Hook., *Vittaria lineata*, Swz., *Notholæna sinuata*, Kaulf., *N. ferruginea*, Desv., and *N. Newberryi*, Eaton.

Bulletin of Torrey Botanical Club, December.—Dr. Gray has two notes, one upon the confusion of the names *Dielytra*, *Dielytra* and *Dicentra*, the other upon a sporting *Trillium grandiflorum*.

Some New Musci, by C. F. Austin.—Dicranum (Campylopus) Donnellii, n. sp. (*D. subleucogaster*, Aust. Exsic. Suppl. I, n. 470, non C. Mull.)—A *D. subleucogastri* differt; colore amœne fulvo-viridi, foliis magis apertis subfalcatis longius et magis subito attenuatis apice sæpe albicantibus spinuloso-serratis, costa angustiori laxiori, etc.

D. porphyrrodyction, Mitt. proximum; differt tamen cellulis superioribus folii multum brevioribus (minutis quadrato–ovalibus), costa latiori multum longius excurrente apice magis serrata, etc.

Southern Florida, common. Associated with *D. gracilicaulis*, Mitt. and at least three other species: among them is—

Dicranum (Campylopus) angustiretis, n. sp.?—Adspectu *C. gracilicauli* versimile, sed foliis inferioribus minus appressis cellulis multum longioribus (sublinearibus) alaribus rufo purpureis tenuioribus valde constrictis, statim distinguitur.

Leptotrichum homomallum (*Hedw.*) var.? erosum.—A forma normali differt; foliis eroso-serratis. Plantæ utriusque sexus in eodem cæspite: sterile. (An species distincta?)

Vancouver's Island, May, 1875, *Macoun*.

Dicranum (Campylopus) Virginicum, n. sp.—Dioicum, sat dense lateque depresso-cæspitosum; cæspite læte fulvo-viridi, caule subintricato vix ultra unciam longo laxo flexuoso tenui subæqualiter laxe folioso juniori albido-tomentoso, foliis (apicalibus nonnullis exceptis) strictiusculis erecto-apertis a basi subquadrato-ovata raptim longe subulato-setaceis canaliculatis toto margine minute serratis, costa lata striata viridi inferne folii latitudinem 1-5 to 1-3 subulamque fere totam occupante dorso scabra vel apicem versus subserrata, cellulis ad basin et in medio versus eam permultis laxis hyalinis albidis oblongis et ovalibus cæteris plerumque rhomboido-oblongis linearibusve: foliis apicalibus nonnullis a basi angustiori truncata fragili deciduis magis convolutis multum longius sensim attenuatis toto margine integerrimis dorso lævissimis, cellulis brevioribus basiloribus hyalinis vix ullis, costa ægre a lamina distincta: cætera desunt.

Blackwater Falls, West Virginia, July 5, 1878, *Capt. J. Donnell Smith*.

Stems slender and scarcely exceeding an inch in length; the younger ones lightly clothed with a delicate entangled white tomentum. About one half of the expanded portion of the leaf is composed of large hyaline cells. Ascending along the costa these gradually become smaller and chlorophyllose, while towards the margin they rapidly become much narrower and longer. The basal cells, although much enlarged are not inflated. There appear to be no true alar

cells. The lamina rarely extends to the middle of the subulate portion of the leaf. A curious feature is the deciduous leaves above described. On account of the longer cells of the lamina it cannot be confounded with either *D. subleucogaster* or *D. Donnellii*.

Calymperes Donnellii, n. sp.—Caule perbrevi gregario-cæspitoso; foliis flexuoso- et subrecurvo-patentibus (siccitate constrictis et magis patentibus) e basi angustata longe ligulatis obtusiuscule acutatis canaliculatis integerrimis opacis minime crebre papillosis angustissime incrassato-marginatis vel margine concolore nonnullo planis superioribus apice valde constrictis, costa concolori valida percurrente apice granulifera, cellulis minimis basilaribus per spatium magnum acutum amplis hyalinis: cætera desunt.

On trunks of trees, Caloosa, Florida, March, 1878, *J. D. S.* and *C. F. A.*; scarce.

Closely allied to *C. Richardi*, C. M. (Aust. Exsic. Suppl. I.); but readily distinguished by the leaves being flexuose-patent when dry; they are also nearly twice as long, more opake and more minutely areolated—the contracted granuliferous apex of the upper leaves about half as broad, but usually much longer; the hyaline portion at the base is composed of notably smaller cells, and is of a different shape—the dividing line between it and the opake portion passing very obliquely upward from near the margin to the costa (much as in *C. disciforme*). Remarkable for the most minute ordinary leaf-cells, and for the leaves being widely spreading when dry.

C. disciforme, C. Mull with the upper leaves very broad and bearing filaments on the costa was also found sparingly on the Caloosa; also *C.? crispus*, Aust. Bot. Gazette, II, p. 109 (*Syrrhopodon?*).

There are indications of another new *Calymperes* from Caloosa, Fla.; differing from *C. disciforme* in much narrower leaves, with filaments borne on the costa from middle to apex. I have named it provisionally, *Calymperes filigera*.

Fissidens Donnellii, n. sp.—Dioicus, minutulus; foliis 3–4–jugis immarginatis papillosis margine crenulato-serratis inferioribus oblongo-ovatis cæteris multo majoribus lanceolato-linealibus, duplicatura ad medium producta, costa sub apice finiente, cellulis perminutis papilla unica obtectis; pedicello perbrevi, capsulis destructis.

On the base of trees in a cypress swamp, Caloosa, Florida. March, 1878, *J. D. S.* and *C. F. A.*

This species is characterized by the papillose and crenulate immarginate leaves, consisting of but 3 or 4 pairs,—the upper ones considerably elongated. The male and female plants grow together. Un-

doubtedly it is closely related to *F. subcrenatus*, Schimp.; but that is said to have 5 or 6 pairs of *lanceolate* leaves.

F. Garberi, James, ined.—another very small species with more numerous immarginate leaves was found on rotten wood and shells, on the Indian River, in 1877, by Capt. Smith. It also occurs sparingly in Southwest Florida.

The following species have also been found in Florida: *F. Ravenelii*, *F. incurvus* (vere), *F. subbasilaris*, *F. decipiens*, *F. taxifolius*, *F. adiantoides*, *Conomitrium Julianum* and *C. Hallianum*. The last two on the under side of floating logs in cypress swamps.

Bryum (Cladodium) flexuosum, n. sp.—Caule laxe cæspitoso brevi innovante erecto, foliis pallide rubris erectis ovatis subconcavis acutis, margine plano vel demum recurvo integerrimo, costa valida percurrente vel excurrente, capsula in pedicello 1½–2 unciali tenui flexuoso pallide rubro obovato-oblonga pallida subhorizontali, operculo majusculo depresso conico minute mammillato, peristomi interni cum externi adhærente, ciliolis nullis: dioca? flore masc. terminali majusculo bartramiduloideo.

On gravelly ground, Blackwater River, British Columbia, Macoun, (1875).

Readily distinguished by the short reddish stems, long flexuose pedicel and pale oblongish capsule *not tapering at the base*.

Neckera (Pilotrichum?) Floridana, n. sp.?—Caule primario repente radiculoso innovandi-ramoso submicrophyllo, foliis ovato-lanceolatis acuminatis ecostatis lævibus margine planis, secundario compressiusculo (vel siccitate teretiusculo) erecto (vel pendulo?) stricto vel curvulo simplici vel parce ramuloso apice obtusiusculo nonnunquam stelloideo, foliis erecto-apertis imbricatis anguste oblongo-lanceolatis profunde canaliculatis vel cymbiforme-excavatis sensim acutatis supra medium plicato-striatis utrimque minutissime subobsoleteve papillosis margine late revolutis integerrimis obsoletissimeve serrulatis pro more supra medium leviter simpliciter costatis, cellulis minutissimis lineari-fusiformibus fere rectis basilaribus paulo latioribus quadratis subseriatis granulosis ad angulos spatium magnum distinctum formantis: cætera desunt.

On trees, Caloosa, Florida, March, 1878, *J. D. S.* and *C. F. A.*

Leaves usually with a plica near the margin at the base, or often extending to near the apex; costa very light and usually extending a little way above the middle. Possibly a *Meteorium*.

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GERARDIA TENUIFOLIA, Vahl, var. ASPERULA.—Leaves all nearly filiform, the upper side hispidulo scabrous or asperulous (in the manner of *G. aspera*): inflorescence more paniculate and with the pedicels all ascending: corolla small, the expanded limb only half an inch in diameter.

Dry and bare hills and bluffs, Missouri to Minnesota, Wisconsin, and Michigan. This well marked variety I received many years ago from the late *T. J. Hale*, who collected it at St. Croix, Wisconsin, and in Fillmore Co., Minnesota; and I have also a fragment from Michigan. Mr. H. Eggert of St. Louis—a good collector and keen observer—now sends it from Eastern Missouri, and notes how different it is from the *G. tenuifolia* of the neighborhood (but which grows in open woods), the latter being my var. *macrophylla* or approaching it. The present plant diverges quite as much from the typical *G. tenuifolia* in another direction, and should certainly have a distinctive name.—

ASA GRAY.

SOME RARE PLANTS.—In Mr. Curtiss' last article on the Flora of the Shell Islands of Northern Florida, he mentions the fact of his finding a species of *Peperomia*. Judging from the meagre description given it is probably the same plant as one found by Miss Reynolds in the Indian river region of that State, and which can be confidently stated to be identical with specimens in the Herbarium of the Academy of Natural Sciences of Philadelphia, collected by Nuttall's correspondent Mr. Ware, and described by that author, as I am informed by Dr. Gray, in an early number of Silliman's Journal. Nuttall's ticket reads thus: "**Piper leptostachyon*, East Florida, Mr. Ware." The asterisk, as given above, is his well known indication of a new species. The plant is evidently a *Peperomia*, a genus separated from *Piper* (as I suppose) since the date of the above mentioned publication. It is singular that this plant, so long ago discovered, should not have been again detected until during the past year, and that the publication of the name, with well preserved specimens to back it, should have been neglected by subsequent authors. At least one other species, *P. magnoliæfolia*, has been found within a year or two by Dr. Garber in South Florida.

Miss Reynolds had the good fortune to make another acquisition in the same district in a species of *Callisia*, which, if not identical, is very near a Cuban Species, the *C. meiandra* of Charles Wright (his No. 3728). The genus is nearly allied to *Tradescantia*.

Two other notes of rare plants may be worth making. Dr. Mellichamp has found *Vincetoxicum scoparium*, Gray, (*Cynoctonium?* Chapman) at Bluffton, South Carolinia, and Mr. Shriver has sent specimens of *Adiantum Capillus-Veneris*, L., from the banks of New River. Wythe County, Virginia.—Wm. M. Canby.

Erratum.—In Mr. Canby's article on *Baptisia* in the April No. of the Gazette, page 131, line 14 from bottom, for "septa" read sutures.

The Yellow Snow—Pollen Grains or Algæ?—A microscopic examination of a portion of the yellow matter, which appeared in the streets of Easton after the snow storm of Monday morning, March 17th, proves it to consist of pollen grains, united at first, but separated when dry, or when again wetted. They correspond in every respect with those of the long-leaved or yellow pines of the Southern States (*Pinus australis*, Michx.). with which they have been carefully compared. This pine, though very abundant in the lowlands of North Carolina, does not extend north into Virginia. The specimen in flower, which furnished the pollen for comparison, was gathered near Wilmington, N. C., in the month of March. Currents of air have, no doubt, brought from that distant region enough of the pollen to powder lightly a considerable district in Northeastern Pennsylvania. Thus far, it has been reported as seen in the Counties of Berks, Lehigh, Carbon and Northampton. I may state also that I have found the water in rain-hogsheads, in Central Pennsylvania, covered with pollen of pine trees, brought by the winds from the neighboring mountains at the season of their flowering, in the month of May.—

Thomas C. Porter, *Easton, Pa.*

A Visit to the Shell-Islands of Florida, by A. H. Curtiss.—Paper III.—Few who have visited Florida know even the location of the Sister Islands; many who reside within sight of them know not their names. Fishermen occasionally resort to them but they present little of interest to any one but a botanist, and to him a brief exploration is sufficiently satisfactory, especially as an ever sounding voice seems constantly calling him to the sea-shore. The ocean is in plain sight, yet not easily reached, for there intervenes a vast expanse of marsh and the channel through it is extremely tortuous and difficult to navigate. Once in August the writer made a journey of

sixty miles through a similar marsh, finding but five or six landing places on the whole route. The innumerable creeks winding through them form a watery labyrinth through which the tides struggle for a passage. The vegetation is uninteresting and as monotonous as the landscape. Green walls of rigid *Spartina* hem in the vision on every hand, for one can see but a little way in any direction on account of the windings of the channel which may lead toward every point of the compass within the space of ten minutes. When the tide is high there is no spot on which to set foot; as it falls the water comes streaming out from among the grass over the black shining banks, which harbor innumerable crustaceans, and emit a noisome odor. Where the banks are more elevated the wallow of an alligator may sometimes be seen and occasionally the grass gives place to broad mats of Sea-Purslane and Samphire (*Sesuvium Portulacastrum* and *Salicornia fruticosa*). No cheerful sounds greet the ear, the silence is only broken by the harsh cries of marsh fowls, and the ocean's mournful, never ceasing war. Standing up in the boat one looks out over a vast green plain and sees in the distance or near by, islands, light-houses and sails, but the nearest objects may be the most inaccessible, and a day's journey end almost where it began. Indeed, upon reaching Cedar Point, the first landing on the Sister Islands Channel, although we have traveled four or five miles, we are evidently farther from the ocean than when we started. But here we are able to take a new course leading directly to the inlet which separates Talbot from Fort George Island. These are the southernmost of the islands which give rise to the land-locked or inland passage to Florida. North of Talbot is Amelia Island, on which the city of Fernandina is situated. Between Talbot and the mouth of the St. Johns is Ft. George Island, a favorite resort of tourists, who here enjoy the privileges of a fine hotel situated near the sea-beach and among forests of tropical luxuriance. From the observatory one looks down upon the shaggy forest of gnarled oaks and plumy palms, to the west, over far stretching marshes, eastward, over the boundless ocean. On the south the "river of lakes" finishes its marvelous course and pours the waters of Florida into the ocean. At its mouth is the much dreaded "bar" marked by a line of foaming breakers. Across the river are the white sand hills and summer cottages of Mayport, a name associated with the young and promising botanist, Henry D. Keeler, who, alas! now sleeps beneath northern snows. His father, the collector of the port, resides a mile out on the road to St. Augustine. It is a sylvan home embosomed in grand forests of Palmetto,

which open eastward and allow a fine view of the ocean. Great natural beauties and art skillfully directed, have conspired to render this a home worthy its cultured occupants, who have bestowed upon it the Greek name Thalassa. The Palmetto is the glory of the "land of flowers," and here, at the very gates of the State one may see it in its perfect development, and study it in its various stages of growth. During the first year the Palmetto puts forth one or two lanceolate, plaited leaves and a multitude of tough, cord-like roots. Having securely established itself in the ground it begins to develop its characteristic fan-shaped leaves, the linear divisions of which diverge from a stout, recurved midrib. For many years the trunk is concealed by the imbricated bases of the huge leaf-stalks; these are provided with sheaths of tough, interwoven brown fibres, which encircle the stem and hold them in position long after the leaves disappear. These old leaf-stalks split at the base as the trunk enlarges, become bleached, and, bristling from the trunks like ivory tusks, present a most singular appearance. After many years the leaf-stalks fall off and leave exposed the brown, cylindrical, somewhat ringed trunks which are sometimes thicker at the top than at the bottom. The small, creamy-white flowers are borne in immense panicles and are succeeded by black berries which have the flavor of dates and are generally gathered by birds before they mature. To the extreme diversity of appearance of the Palmetto, these forests mainly owe their peculiar beauty. Each heightening the effect of the other, the scene borrows grace from the young sprays, grandeur from the towering brown shafts and picturesqueness from the white-pronged trunks of the younger trees, while variety and contrast are added by numerous species of Magnolia, Oak, Bay and other evergreen trees, whose leaning trunks and larger branches support ærial gardens of Ferns, Orchids, Tillandsias and innumerable vines. The transition from these forests to the shrubby thickets bordering the sea is as sudden and surprising as if one were to step from Cuba into Labrador. There, from a black vegetable mold and in a damp atmosphere, every thing grows in tropical luxuriance, here on the storm-swept sands, the Bay-berry, Ilex, and Dwarf Oaks interlock their rigid branches as if in mutual protection against the elements, forming impenetrable copses, reminding one of the growths found on mountains. Between the limits of aborescent growth and the sea is a desolate expanse of white sand, in places smooth as a floor, in others hollowed out into moats which are filled with water, and in others piled up in hillocks or dunes, which appear like earth-works thrown

up against the invading elements. It is a region where the storm king holds undisputed sway, over which fierce winds and tumultuous waves sweep with resistless fury. Following the shore close by the swelling surf, treading the line which bounds an ocean from a continent, the mind is filled with a sense of awe, of unreality, with a fascination which tempts one to wander "on and on forever," forgetful of the past, unmindful of the future, striving to catch the meaning of the ocean's strange murmur, to form a conception of its vastness and of the strange world of life concealed within it. In such musings we indulge for a few moments, then our attention is diverted to the novel and curious objects on the shore. Hundreds of white winged cranes are watching for what the sea may cast up, their moving forms scarcely distinguishable in the distance from white breakers; overhead sea-gulls wheel and scream, while over the beach spirit-crabs hurry sidewise on the tips of their claws, watching us with their baleful eyes and suddenly sink into their holes. Soon, everything brought for the purpose, is filled with shells, coral, Sponges, Echinoderms, Hydroids and Algæ. Then we begin to throw out poor specimens and substitute better and finally send our collections to the boat and turn our attention to the singular maritime plants, which, farther back from the shore are found in considerable variety. They are rigid, succulent, and generally devoid of the ordinary elements of beauty. Still farther from the shore the dreary landscape is brightened by patches of a remarkable grass, a long-awned variety of the *Muhlenbergia capillaris*. Its panicles are of silky softness and of a purplish crimson color. Growing as it does in dense clumps, when seen at a distance it has the appearance of crimson Phloxes. Nearest to the ocean, growing on the dunes, is found another and very different grass, the *Uniola paniculata*, commonly called sea-oats, and much used for ornamental purposes. It is a tough, leathery grass, growing in large clumps, so deeply rooted that it is little affected either by wind or waves. Its heads are borne in graceful panicles on stems from three to five feet high. In almost equally exposed locations is found a very singular Composite, the *Iva imbricata*. The influence of sea-water upon this plant, in producing an extraordinary distension of the cells and thickening of the involucres and leaves is very marked, as much so as in the common maritime *Chenopodiaceæ*, which are here well represented. The *Sesuvium Portulacastrum* grows in less exposed situations in great abundance, likewise the little *Vilfa Virginica*. On the sandy bluffs facing the sea, is found a variety of plants of quite a different character. The *Croton maritimum*

Phyllanthus Carolinianus, *Euphorbia polygonifolia*, *Ipomea Pes-capræ*, and *Batatas littoralis*. The last is in the same genus with the sweet potato which it closely resembles in flower and mode of growth. The leaves are thick but rather small, and probably present as great variety of form as any known plant. The daylight fails us ere we finish our search, the moon has risen, and the light-house fires begin to shine through the darkness. A parting stroll along the shore and we will bid it farewell. The sandy waste gleams white in the moonlight with a cold wintry aspect. Listening to the voices which arise from the dark abyss of waters, we hear tales of centuries past, when quaintly built ships from Spain and France sought these shores and upon them landed mailed warriors and adventurous cavaliers. For more than three centuries the armies of foreign nations fought for possession of the "flowery land," while the title of each was disputed by a warlike race of Indians. But they have all passed away, and of all scarcely a relic remains. This bloody epoch in the history of Florida is ended and this favored region, where so much of human life and energy has been wasted, has at last become, as designed by nature, an asylum for suffering humanity. Thousands do now resort to this land of perpetual verdure, seeking, not like De Leon, for a fountain of immortal youth but for renewed health and prolonged life.

Alternanthera lanuginosa in Kansas.—Among some collections made by Mr. I. C. Martindale and myself in Central Kansas last summer, I find *Alternanthera lanuginosa* of Torrey in the Mexican Boundary Survey. I am not quite sure of the location, but it was between Fort Harker and Fort Hayes. I have seen this enumerated in no list of Kansas Plants, and I suppose it has not been found anywhere near so far north before.—Thomas Meehan, *Germantown, Pa.*

Bentham on Nomenclature.—In the American Journal of Science and Arts for April, Dr. Gray gives a review of Bentham's "Notes on *Euphorbiaceæ*," in which some remarks on nomenclature are made. They are so timely and interesting that we cannot refrain from publishing them.

The general laws of nomenclature of our day, and the principles on which they rest, are laid down in the code which was reported by Alphonse DeCandolle to the Paris International Convention, in the year 1867, and being approved, was published with a commentary in the autumn of that year, and in an English translation early in the ollowing year. The laws, without the commentary, were printed in

this Journal for July, 1868. The ten years succeeding have tested, somewhat thoroughly, the questions (nearly all of minor moment) upon which differing usages prevailed; and though one or two points are still mooted, the great majority of phænogamous botanists are coming to be of one mind and practice. But, as Mr. Bentham remarks: "The result has not been quite effectual in checking the ever-increasing spread of confusion in synonymy. Besides the young liberal-minded botanists who scorn to submit to any rule but their own, there are others who differ materially in their interpretation of some of the laws, or who do not perceive that in following too strictly their letter instead of their spirit, they are only adding needlessly to the general disorder. In the application as well as the interpretation of these rules they do not sufficiently bear in mind two general principles: first, that the object of the Linnæan nomenclature is the ready identification of species, genera, or other groups for study or reference, not the glorification of botanists; and secondly, that changing an established name is very different from giving a new name to a new plant."

It is to the latter point that this most experienced and even-minded botanist addresses himself. "The rule that long-established custom amounts to prescription, and may justify the maintenance of names which form exceptions to those laws which should be strictly adhered to in naming new plants, is unfortunately now frequently ignored. The law of priority is an excellent one; and when a genus or species has been well defined by an early botanist in a generally accessible work, but has subsequently been neglected, and the plant became known under other names, it is well that the original one should be restored. On the other hand it creates nothing but confusion to suppress a generic name, well characterized and universally adopted by long custom, in favor of a long-forgotten one, vaguely designated in an obscure work, out of the reach of the great majority of botanists. The greater number of Necker's genera have been so imperfectly characterized, with so absurd a terminology, that they are quite indeterminable; and his names deserve to be absolutely ignored, except in the very few cases where Jussieu or other early French botanists have succeeded in identifying them, and corrected their characters; but even then it is doubtful whether these names should not bear the date of the correction, rather than of the original work. Adanson's "Familles," with all the inconveniences of its form and absurd orthography, is much more scientific, and many of his genera are well defined, and have therefore been properly adopted."

Let us here interject a practical application. There is an old and well established genus *Smilacina*, of Desfontaines. There is a much older genus *Tovaria*, of Ruiz and Pavon, founded in 1794, ever since accepted, and without a synonym. Recently Mr. Baker of Kew, finding that Necker has a *Tovaria*, published in 1790, and therefore four years earlier than that of Ruiz and Pavon, takes up this name in place of *Smilacina*, and leaves a new name to be made for the long-established homonymous genus. It will be said that the rule of priority demands the sacrifice, and that the identification of Necker's genus is sure, because the three Linnæan species of *Convallaria* which properly constitute Desfontaines' *Smilacina* are referred to it by name; and that, though it be a case of *summum jus summa injuria*, the injurious consequence is a necessity. But Mr. Bentham's characterization of Necker's work applies even to this instance. Twice over Necker's *Tovaria* is described as having a perianth of five sepals, and the berry is said to be one-celled. Desfontaines' *Smilacina*, on the other hand, is correctly characterized. Moreover, if we do not include this among those names of Necker which, Mr. Bentham says, "deserve to be absolutely ignored," we may yet find that the law of priority has another claim on it. In 1763, a much better botanist than Necker, viz: Adanson, founded a genus *Tovara* (essentially the same name as *Tovaria*) on *Polygonum Virginianum*, L., which is not unlikely to be taken up as a genus; and the name would supersede Necker's by the same rule that Necker's supersedes Desfontaines' *Smilacina*. All things considered, then, this is a case for the application of the homely but useful rule *Quieta non movere;* and much of Mr. Bentham's pertinent advice may be condensed into this maxim. But there remain nice questions to settle with regard to the names and extent of the liliaceous genus.

"The representing the Greek aspirate by an *h* was generally neglected by early botanists; but now, ever since DeCandolle altered *Elichrysum* into *Helichrysum*, modern purists have insisted upon inserting the *h* in all cases; and this has been so far acquiesced in that it is difficult now to object to it, though it has the effect of removing so many generic names to a distant part of all indexes, alphabetical catalogues, etc. Admitting the propriety of adding the aspirate in new names, I had long declined to alter old names on this account; now, however, I find myself compelled to follow the current," which is, on the whole, regretable, as Alph. DeCandolle would hold out with him. See the latter's comment on his Article 66, in which the remark is dropped that, "we do not see why we should be more

vigorous than the Greeks themselves." Oddly enough, these same writers who must supply the aspirate to the *e* omit it from the *r*, and write *rachis* and *raphe*, instead of *rhachis* and *rhaphe*,—which is exasperating to lovers of uniformity.

Some New Musci, by C. F. Austin.—Neckera (Orthostichella) Ludoviciæ, C. M.—Muller's diagnosis of this species was founded on depauperate sterile specimens. It was found in fine condition in East Florida two years ago, by Capt. J. Donnell Smith, where it appears to be abundant. It is *robust* and quite different in appearance from *N. cymbifolium*, the stems being longer and usually furnished with numerous short branches. Leaves fulvous green, abruptly acuminate, papillose; cells linear, flexuose. Perichætial leaves with much elongated, abrupt hair-like eroded points. Some of the paraphyses leaf-like. Capsule elliptico-ovate, erect, tapering at the base, narrowed at the apex, solid, smooth, on a stout minutely roughened pedicel about 6 lines long; annulus 0; operculum convex or very shortly rostellate; peristomal teeth short and imperfect, linear, hyaline, subpapillose, incurved; calyptra with erect hairs.—*N. cymbifolium* is also abundant in East Florida, but has not yet been found in fruit.

Hypnum (Rhynchostegium?) Caloosiense, n. sp.—Autoicum, prostratum; caule intricato 2–3 uncias longo sat copiose subpinnatim ramoso paraphyllato, foliis sub-complanatis late suboblique ovatis subacuminatis, margine integerrima apicem versus obsoleteve serrulata plana vel inferiori versus basin late incurva, costa gemella pro more distincta longiuscula haud raro ad medium producta, cellulis perlaxis rhomboideo-fusiformibus rectis; paraphyliis conspicuis longe subulatis subfasciculatis; capsula late ovali in pedicello lævi subunciali pendula siccitate sub ore lato valde constricta basi valde obtusa: flores cauligeni parvi; bracteis acuminatis, acumine recurvo; paraphysibus paucis brevibus.

Low hummocks, along the Caloosahatchie River, Florida, March, 1878. *J. D. S.* and *C. F. A.*

In some respects like both *H. deplanatum*, Schimp. and *H. micans*, Swartz; but it is readily distinguished from the former by its autoicous inflorescene, shorter pointed entire leaves, and much longer entire paraphyllia; from the latter by its more obsoletely serrated leaves, and by the presence of paraphyllia on the stem; and from both by its darker green color, subpinnately and more copiously branched stems, much more loosely areolated leaves with the lower

margin often broadly inflexed, longer costa with the divisions more divergent above and less united at the base, and by the pendulous capsule. (Capsules too old; operculum, etc., not seen.)

H. deplanatum has minute ovate serrate either paraphyllia or paraphyllia like bracts on the stem, above the bases of the leaves. They are arranged in a bud-like ring, and are possibly bracts belonging to incipient branches.

Hypnum (Brachythecium) Donnellii, n.sp.—Autoicum, amœne læte vel subaureo-viride, nitens; caule brevi depresso-cæspitoso vel arcte repente flexuoso subsimplici; foliis caulinis ovato-lanceolatis tenui acuminatis integerrimis (vel raro apice remote serrulatis) lenissime falcatis erectiusculis laxe imbricatis convexiusculis lævibus semicostatis, costa a lata basi tenui, cellulis pro genere permagnis superioribus lineari-fusiformibus rectis acutissimis, basilaribus permultis latioribus quadratis; capsula in pedicello lævi seminnciali tenuissimo minima ovali subhorizontali, operculo depresso-conico, peristomio interno breviusculo processibus subintegris ciliolis imperfectis, annulo—? calyptra nuda: foliis perichætialibus minoribus subconformibus ecostatis haud piliferis; organis genitalium brevissimis paraphysibus nullis.

On rotten wood, roots of trees and shells, on the shell mounds of Charlotte Harbor (Pine Island), Florida, March, 1878. *J. D. S.* and *C. F. A.*

This fine species is readily distinguished by its estriate entire leaves, short smooth pedicel, minute subhorizontal capsule, imperfect inner peristome, etc. Costa of leaf broad at the base, gradually becoming obsolete about midway to the apex. The fusiform cells of the upper part of the leaf pass abruptly into the numerous quadrate ones of the base; the dividing line between them passing very obliquely upward from the costa to the margin of the leaf,—more so than in the *H. acuminatum*, less so than in *H. subcapillatum*. Closely related to *H. acuminatum*, Beauv.; but that is larger, with leaves bisulcate at the base, serrulate, the quadrate basal cells smaller and not passing so far up the margin, pedicel longer and stouter, capsule larger, erect, etc.

Brachythecum biventrosum, C. M. (*B. splendens*, Aust.) was found in great abundance on cypress stumps, limestone rocks, etc., in the Gulf Hummock, near Rosedale; the fruit (in March) was too old. Fine specimens of this species were confounded with *Hypnum acuminatum*, var. *rupincola* in Sulliv. and Lesqx. Exsic. Ed. 2, n. 492. It is rather

a robust species and appears to have been originally described by Muller from a depauperate form. The pedicel is obsoletely scabrous.

NOTES FROM MICHIGAN.—The underground stems of *Poa pratensis* do often penetrate and sometimes grow entirely through the tubers of potatoes. I saw a number of such cases last year. The thing is so common I never considered it worth recording. As Prof. Beal suggests, quick-grass may, in some instances, have been spread by this means.

Quercus bicolor, common on the banks of Maple and Grand Rivers, often produces abortive acorns in the axils of the cup scales, as has been recorded of *Q. prinoides*, Willd. It would be interesting to know if all the Chestnut Oaks do the same.—ERWIN F. SMITH.

CORRECTION.—In connection with the note on *Panicum litorale*, Vasey, in the last number of the GAZETTE, it should have been stated that the note from Gen. Munro was sent by Dr. Vasey for publication.

RECENT PUBLICATIONS.—*Catalogue of the "Davenport Herbarium" of North American Ferns*, by Geo. E. Davenport.—This Catalogue has just made its appearance and is certainly well done. The Davenport Herbarium contains specimens of every authentic species of Ferns in North America north of Mexico, so that a catalogue of it is nothing else than a complete catalogue of the Ferns of North America. The type is large and clear and the names stand out well on the page, making as complete and convenient a check list as a botanist could well desire. The catalogue contains 32 genera, 142 species, and 16 varieties. Mr. Davenport is sparing in his use of varieties, very wisely deeming it not necessary to admit to such rank every slight deviation. The geographical distribution is based upon Mr. John H. Redfield's paper upon that subject in the Torrey Club Bulletin for Jan., 1875. Six geographical divisions are thus recognized, the names of which are sufficiently clear without definition, viz: Cosmopolitan, Boreal, Appalachian, Pacific, New Mexican, and Tropical. Prof. D. C. Eaton is followed in nomenclature. Mr. Davenport desires to add to the herbarium the remaining vascular cryptogams of the United States, and solicits specimens for that purpose. The Catalogue is well worth the patronage of all botanists, and published as it is at the author's expense, it is but simple justice for all to help bear the expense of that which is to benefit all. We hope therefore that botanists will send promptly to Mr. Davenport for copies, which can be had for 50 cents, by addressing him at Medford, Mass.

Proceedings of the Acad. Nat. Sci. of Philadelphia. Part III, Sept.,

Oct., Nov. and Dec., 1878.—The botanical contents are "On the Black Mildew of Walls," by Dr. Jos. Leidy, "Irritable or Sensitive Stamens," "Calluna vulgaris," "Dimorphism in Mitchella repens," by Thos. Meehan, and "Aspidium aculeatum in Pennsylvania," by Mr. Crozer Griffith.

Transactions of the Kansas Academy of Science, 1877 and 1878.—This makes a very neat pamphlet of 94 pages and is filled with interesting notes in almost every department of science. The botanical section is occupied chiefly in listing the plants of Kansas.

American Journal of Science and Arts, April.—Besides the article quoted from above, Dr. Gray has a notice of a paper by Strasburger on "*Polyembryony, true and false, and its relation to Parthenogenesis.*" According to Strasburger's investigations the embryo-sac of angiosperms very seldom produces more than one embryonal vesicle which is fecundated. The fact that many seeds contain more than one embryo is explained by the statement that they are adventitious, formed outside of the embryo-sac and enter it by pushing the walls before them or by piercing them. Thus situated they can hardly be distinguished from the embryo that has resulted from fecundation. This then explains the well known cases of *parthenogenesis*.

American Naturalist, April.—Mr. E. J. Hill has a note on the "Number of Stamens in *Brasenia peltata*." From a study of specimens from several localities he concludes that the typical number is six, the number ranging from 12 to 36.

Bulletin of Torrey Botanical Club, Jan. and Feb.—Francis Wolle has an article on Fresh Water Algæ, being a synopsis of discoveries and researches in 1878. An obituary notice is given of Robt. H. Brownne, who died Feb. 15, 1879, at the age of 69.

Fern Etchings, by John Williamson.—Mr. Williamson is preparing a work bearing the above title. It will contain etchings of all the Ferns that have been found in the Eastern and Middle States. The price will be $7.50 a copy, including mailing. Any one desiring to subscribe for the work can address the author at Louisville, Ky.

Monographiæ Phanerogamarum.—The work upon the Monograph of the *Araceæ*, by Dr. Engler, for Vol. 2 of the *Monographiæ Phanerogamarum*, is already advanced. It will form one volume, for the number of known species has very greatly increased. In a third volume will be given Monographs of the *Cucurbitaceæ* by M. Alf. Cogniaux, and the *Araliaceæ* by M. Marchall. Later will be given the immense work of Gen. Wm. Munro upon *Gramineæ*, in the meantime other small families being given.

COLUMBIA COLLEGE
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INFLUENCE OF THE SCION ON THE STOCK.—It is now very well known that many of our variegated varieties of green house *Abutilons* are produced by budding. A species with a variegated leaved form is grafted on another species, and from the branches which spring from the stock beneath the bud or graft, come out in some cases variegated ones—the same as the stock in all cases. There is no hybridity, only the variegation is communicated to the sprout from the stock.

Three years ago a bud of the blood-leaved variety of *Betula alba* was put into a strong stock of *B. alba*, var. *populifolia*, our American form. The following spring the bud made a growth of nearly a foot in length, when a careless laborer pushing against it, knocked the growing shoot completely out. Over the place where it grew a bud of the cut-leaved Birch was inserted, which, growing, caused the stock to be preserved. Last spring, several inches below the place where the original bud of the blood-leaved variety had been torn out, a branch of a blood-leaved color pushed forth. It attained a height of nearly two feet the past summer, and the stock still shows the scar of the original bud. That such transfusion of character can be carried downward in the stock is not new, as already noted in *Abutilon*, but I think it is new that this coloring principle can exist in the stock for ten months after all the foliage has been destroyed, and nothing but a portion of the original bark of the bud remained.

Another novel point is that whereas in other cases only the "variegating material" has been transfused downwards, the specific, or it may be varietal, character remaining intact; in this case the new bud from the *populifolia* stock is the true European *alba*, showing that in this case more character than that of mere coloring has been transmitted through the structure of the stock. I may remark that many botanists receive *B. populifolia* as but a variety of *B. alba*. As long as it is not possible to define what is a species, there may be an allowable difference of opinion, but it seems to me there are as many permanent distinctions as in many other universally acknowledged species of plants. There is one distinction which I have never seen noted. In *B. populifolia* the leaves spread flat at once in expanding,

while those of *B. alba* are bent upward until mature. I enclose samples from the stock and blood-leaved shoot to illustrate this distinction.—Thos. Meehan.

Notes from Colorado.—The lateral canons of the Arkansas Canon between Canon City and Spike Buck Canon, have generally no running water in them. Where they come down into the main canon is a mass of boulders, rocks and sand spreading fan-like in all directions. This "wash" at the mouths of the canons, three to five hundred feet from the river, is from ten to eighty feet deep. Upon these "washes" bushy trees of *Juniperus occidentalis* that are more than a hundred years old often grow, and *Opuntia arborescens* as much older than twenty as years it has missed forming a new joint, with old bushes of *Bigelovia* and many other species of shrubby plants. Two dead trees of *Pinus ponderosa*, one large and one medium size apparently grew upon one of these washes, but a railway cut uncovering their buried trunks showed that since they had attained their present size, a "water spout" bringing rocks and sand down from the mountains, had formed a new surface about the trees fifteen feet above the old one. Along the base of the mountains on the plains it is not uncommon to find old cottonwood stumps, rotted away, leaving a hole eight or ten feet deep down into the soil which has been washed about them, but the pines, growing in rocky localities can not often be subjected to such catastrophes.—T. S. Brandegee.

Regular flower in Pedicularis Canadensis.—On May 2d, 1877, I collected near this place a specimen of this plant, which I have carefully preserved in the Herbarium of Purdue University, having a strictly regular flower growing from the apex of one of the spicate racemes. The position of the flower as well as the perfect regularity of the corolla, attracted my attention and I carefully preserved it and in a note pinned upon the sheet on which it was fastened is the following description which I copy:

The flower is salver form in shape, the tube spreading abruptly above, with a regular border of six lobes each a full line in length. The lobes turn back and face outward, the edges being rolled for two thirds of the length of the lobes, giving them the appearance of being acute. At each sinus between the corolla lobes and just within the border, was a gibbous protuberance whose blunt point extended a very little beyond the base of the sinus. The calyx was somewhat irregularly four-lobed, one lobe having a tooth in its margin. The calyx was also split down further on one side than on the other, and

was about one-half the length of the tube of the corolla. The stamens were four, exserted, on slender filaments, erect and about equalling the pistil. The corolla was twisted from the base to the border to the extent of about one-fourth of the circumference.—John Hussey, *Purdue University, La Fayette, Ind.*

The Hairs of Lychnis Githago, Lam.—While applying poison (a solution of corrosive sublimate in alcohol) to some herbarium specimens a few days ago, the long soft hairs of the Corn Cockle attracted my attention, and thinking perhaps they would make an interesting study under the microscope, I laid a few aside until I should have leisure to prepare and mount them. Almost every one is familiar with the general appearance of our common *Lychnis*, but perhaps few have noticed particularly the delicate white hairs with which it is clothed. Let me describe them, though what I wish to notice especially, concerns not so much the form of the hair as its movements. The whole plant is covered with these silky, appressed hairs, varying from 2 to 4 lines in length. At the base under the microscope is seen a group of small cells from which the hair tapers to a fine point. It is composed of from three to five cells, which become more attenuated in proportion as they lie nearer the outer extremity, the longest being about 8-hundredths of an inch. The whole hair seems to be somewhat flattened, occasioned probably by drying. When preparing these hairs for mounting, I first placed them in a watch-glass containing strong alcohol. In a few seconds the three commenced swimming about, revolving, rising and falling, continuing the motion as long as they remained in the alcohol. Upon being placed in turpentine the movements ceased.

The question naturally arises, what caused these movements? As was remarked, the hairs of *Lychnis* are somewhat flattened, and when dry are slightly twisted spirally. Upon examining them in the glass of alcohol with a small hand magnifier they were seen to be very much twisted but no motion except the general one could be made out. Taking them from the glass and placing them upon a slide in a drop of alcohol, under a power of 60 diameters, the reason of the swimming could readily be detected. The hairs were twisting and untwisting with considerable rapidity, jerking out of the field and bending upward as though alive. These movements continued for some moments after the drop of liquid had evaporated. The reason of these contortions can not so clearly be made out. It is probably due to the unequal endosmotic action of the cell walls, inasmuch as

the spirit can be seen, before the cell becomes filled, running backward and forward on account of capillary attraction and the decrease in diameter occasioned by the twisting.—C. R. Barnes, *Madison, Ind.*

Trimorphism in Lithospermum canescens, Lehm.—Having occasion last year to collect and study specimens of this interesting species, I found, in the course of my examinations, a plant with flowers differing from the ordinary dimorphous condition. This discovery led to an extended search, the results of which may be interesting.

L. canescens is common in Michigan, as is also the closely related and more showy *L. hirtum*, growing in bunches and blossoming in spring as the former does. The masses of deep orange blossoms contrast finely with the bare, brown hillsides and the light green of the newly leaved over-arching trees. Every gardener knows what a pleasing effect is produced by the massing of color, and I thought, as I gazed on the flaming hill-slopes, that the plant was really handsome and worthy a place in our gardens. It would, however, scarcely be worth cultivating, if that were possible, since the grace of the surroundings would be wanting. This, of course, adds much to the charm of herborizing. If we could carry the freshness of the fields and the delight of discovery into our gardens along with the plants, we should, I dare say, transplant half the herbs we find in our rambles. But, to return to the facts, Prof. Gray says in the Manual that dimorphism sometimes occurs in this genus, and Sir John Lubbock has described a number of Borrageworts in which contrivances for cross-fertilization exist; but I have come across no special mention of *L. canescens*.

I observed three principal flower forms. One form, which I will call No. 1, has a short style, about one-third the length of the corolla tube, with stamens set high up on the tube in the throat. Sometimes the anthers of this form are somewhat exserted, but generally slightly included.

No. 2 has styles varying from considerably included to strongly exserted with stamens near the base of the tube, much below the stigma. It seemed to me I could make out three forms of this No. 2, depending on the length of the style: (a) with style much exserted—there were but few of this kind; (b) with style up to but not projecting from the throat of the corolla—this was the common form; and (c) with style about two-thirds the length of the tube.

No. 3 has the short style of No. 1 with the short stamens of No. 2, thus bringing the stamens and pistils close to each other in the bottom of

the tube. There seemed, also, to be two forms of this: (a) with stamens on a level with the stigma; (b) with stamens half way up the tube. A few flowers were observed with *three* stamens borne as in (a) and the other *two* as in (b).

The comparative scarcity of this third form explains why it has been previously overlooked, only about one-fiftieth of the specimens examined belonging to it. Of the remainder, about three-fifths were No. 2, and the rest No. 1.

The corolla tube of No. 1 has a well defined bulge just under the limb, and below this it is quite attenuated; the tube in the other forms is larger, does not taper gradually to the ovary, and is slightly swelled towards the base. This difference in the tubes is plain, and by it the 1st may be readily distinguished from the 2d and 3d forms.

Fruit sets freely in all the forms, and the anthers of all were well supplied with pollen.—Erwin F. Smith, *Hubbardston, Mich.*

New Species of Fungi, by Chas. H. Peck.—Specimens of the fungi here described have been received from the sources indicated under the respective descriptions.

Paxillus hirsutus.—Pileus convex or nearly plane, hairy, tawny-brown; lamellæ rather broad, subdistant, decurrent, concolorous; stem cylindrical, lateral or eccentric, hairy, concolorous; spores broadly elliptical, .0002–.00025 of an inch long, .00016 of an inch broad.

Plant about two inches high, pileus two inches broad, stem half an inch thick.

Belleville, Ontario. *Prof. J. Macoun.*

The species is apparently related to *Paxillus atrotomentosus*, from which it is separated by its paler color and hairy pileus. From *P. pubescens* it may be distinguished by its glabrous lamellæ. The hairs of the pileus are more conspicuous on the disk, the margin appearing nearly smooth. As no notes were taken of the characters of the plant in the fresh state, the description has necessarily been derived from the dried plant. It is quite probable therefore that the colors of the fresh plant may not accurately agree with those given in the description.

Polyporus Macouni.—Effused, irregularly tuberculate, tawny-ferruginous; pores minute, subrotund, somewhat unequal, the dissepiments generally thick and obtuse; spores subglobose, .00025 of an inch in diameter.

Creeping over and incrusting mosses. Belleville, Ontario, *Macoun.*

The species belongs to the section *Resupinati*. The specimens indicate that the plant is composed of numerous small unequal and irregular confluent tubercular masses whose porous surface gives them a somewhat spongy appearance. The irregular and uneven surface of the whole mass is probably due mainly to the character of the place of growth.

Bovista spinulosa.—Globose, sessile, two to four inches in diameter, whitish, becoming tinged above with yellow and brown, the peridium thick, firm, subcorky, the upper part cracking in rather large areas; capillitium and spores dingy-olive inclining to brown; flocci pale, usually branched, bearing scattered unequal spine-like processes; spores globose, colored, minutely warted, .0004–.0005 of an inch in diameter.

On or near dung of domestic animals in open places. New Mexico. *C. W. Irish.*

This is a remarkable species unlike any other American *Bovista* known to me, both in its thick firm and gourd-like rind or peridium, and in its pale subpellucid filaments which are armed, especially toward their extremities, with prominent spinules. Its spores, too, are larger than those of our other species.

According to the notes kindly furnished me by Mr. Irish, the plants grow in groups of from five to fifteen individuals. They were seen here and there along a trail a distance of about forty miles. When fully developed they are easily loosened from their place of growth and are blown about by the winds. None were found growing in the shade and in some instances small and immature specimens appeared to have been killed by the heat of the sun.

Septoria podophyllina.—Spots large, indefinite, reddish-brown; perithecia epiphyllous, few, clustered on or near the center of the spot, pallid or blackish, slightly prominent, collapsing when dry; spores filiform, variable in length, straight or slightly curved, .0008–.0015 of an inch long.

Living leaves of mandrake, *Podophyllum peltatum*. Illinois. Communicated by *Prof. S. A. Forbes.*

Septoria Lactucæ.—Spots indefinite, pallid or brownish; perithecia minute, scattered, blackish; spores straight or slightly curved, .0008–.0015 of an inch long.

Living leaves of lettuce, *Lactuca sativa*. Illinois. *Forbes.*

Septoria Trillii.—Spots suborbicular, whitish; perithecia numerous, crowded, especially on the center of the spot, black; spores filiform, straight or curved, .0008–.0016 of an inch long.

Living leaves of *Trillium*. Illinois. *Forbes*.

CELLULOSPORIUM *gen. nov.*

Perithecia sphæriform, fragile, rupturing irregularly or the whole upper part falling away; spores large, multicellular.

This is a Coniomycetous genus belonging to the Order SPILERONEMEI. It is apparently related to the genus Coniothyrium but that is characterized by its simple spores, so that our plant could not be referred to it without violating the generic character. I have therefore been obliged to institute a genus for its reception.

CELLULOSPORIUM SPILÆROSPORUM.—Perithecia superficial, subglobose, .01–.02 of an inch in diameter, fragile, black; spores subglobose or broadly elliptical, colored, cellular, .0008–.0012 of an inch long.

Decaying wood. Illinois. *Forbes*.

The fungus appears to the naked eye like some minute black *Sphæria* scattered over the surface of the wood.

PUCCINIA ATROPUNCTA *P. & C. n. sp.*—Spots very small, yellowish, generally with a brownish center; sori numerous, small, slightly prominent, black; spores oblong-clavate, obtuse, constricted at the septum, .0016–.002 of an inch long, .0008–.0009 of an inch broad, the pedicel generally shorter than the spore.

Living leaves of *Veratrum Woodii*. Allenton, Missouri. Communicated by *G. W. Clinton*. Jefferson County, Missouri. Communicated by *E. A. Rau*. Collected by *G. W. Letterman*.

This species is quite distinct from *Puccinia Veratri*, both in color of the sori and in the character of the spores.

RHYTISMA SPARSA *P. & C. n. sp.*—Stroma very small, thin, scattered, less than one line in diameter, suborbicular, slightly convex, black, rupturing by two or three short irregular chinks; asci obovate or elliptical, eight-spored; spores oblong, uniseptate, slightly colored, .0008–.001 of an inch long, slightly constricted at the septum, the cells generally a little unequal.

Both sides of living leaves of *Sabal Palmetto*. Florida. *Clinton*.

This *Rhytisma* is a very small one, appearing to the naked eye like mere dots on the leaf. There is a small pallid or yellowish spot on the leaf opposite each stroma.

SOME NOTES FROM NORTHERN DAKOTA AND MONTANA.—In a paper contributed to the *Medical Record* upon the "Climate and Diseases of Northern Dakota and Montana," Dr. P. F. Harvey makes the following mention of the botany of that region. His observations have

extended from the Red River of the North to Milk River and Fort Custer in Montana:

"The flora of the country embraces a very respectable number of plants, many of great botanical interest, and some of considerable economic importance. Upward of seventy species were observed and analyzed by the writer during the summer of 1878, a few of which it was impossible to properly assign after a careful and searching analysis, and it is believed that the creation of new genera (?) will be necessary for them. Omitting the rarer and minor forms of plant-life as unessential to the present inquiry, it is regarded as sufficient to allude briefly to the prevalent and characteristic growth of the country. The forests fringing the water courses are constituted mainly of *Populus monilifera*, Ait., sparingly intermixed with which is found the *Fraxinus viridis*, Mx. A variety of *Salix*, with *Cornus stolonifera*, Mx., is found growing rather abundantly along the annually submerged river banks. The bark of the latter is dried and smoked by the Indians as a substitute for tobacco. The *Prunus Virginiana*, L. and the *P. Americana*, Marshall, are encountered chiefly along the banks of ravines. The *Shepherdia argentea*, Nutt., is quite common and bears an abundant crop of edible scarlet berries, intensely acid, but rich in pectin, and capable of conversion into an excellent article of jelly. *Vitis cordifolia*, Mx., frost grape, and *Ampelopsis quinquefolia*, are found chiefly among the forest of cottonwood. *Opuntia Missouriensis*, DC., is abundant, but dwarfed on the uplands.

Rosa blanda, Ait., forms dense thickets along the banks of many streams, attaining a height of ten or twelve feet in some instances. The plants, popularly designated as weeds, that are worthy of notice, either on account of their abundance or showy petals, are *Grindelia squarrosa*, Dunal, three varieties of *Ambrosia*, *Helianthus annuus* (?), *Polygonum aviculare*, various species of *Œnothera*, *Anemone Virginiana*, various species of *Aster* and many others. A species of the *Compositæ* grows very abundantly throughout this entire section, and is erroneously called wild sage. Botanically it is the western mugwort, *Artemisia Ludoviciana*, Nutt., var. *latifolia*. It and *A. frigida* are much valued by the Indians, I am informed, in the treatment of fevers, gonorrhea, etc. They use it in the form of decoctions. The buffalo grass (*Buchloe dactyloides*) is abundant throughout the region. Valuable as a nutritious fodder, it is of some interest scientifically as one of the rare examples of a diœcious grass, its male and female flowers differing so widely in appearance that botanists for a long time regarded them as representatives of different genera."

RAPHIDES IN TRILLIUM ERECTUM, VAR. ALBUM.—While making a microscopical examination of the parts of this *Trillium*, my attention was at once attracted by the large and well defined bundles of raphides to be found in the petals. Putting a portion of a petal between two glass sides and pressing them together until the specimen had been rendered nearly transparent, a power of 450 diameters revealed a beautiful display of these bundles. Sometimes three bundles were in the field at once and from no field were they absent. They were much larger than the cells of parenchyma among which they were lying, and in fact they did not seem to pay any attention to cell divisions but lay across them, covering sometimes as many as 4 cells. The bundles lay parallel with each other, pointing towards the base and apex of the petal in the line of most rapid growth. Some of them were very compact, the needles seeming to be firmly united together, while others were beginning to break up and discharge their crystals, caused no doubt by the pressure and consequent flow of sap. The needles were projected from the bundles at all angles, in some cases pushing each other along and thus gaining quite a distance from their starting point.

Having examined raphides in many plants I have found none so plain, none so easily obtained as these from the petals of *Trillium erectum*, var. *album*.—J. M. C.

ÆSTIVATION OF MAHERNIA VERTICILLATA, L.—One of my pupils, Miss Anna Chace, of Valley Falls, R. I., called my attention to the peculiar æstivation of *Mahernia verticillata*, L., a familiar hot-house shrub of the Natural Order *Sterculiaceæ*. She noticed that of the convolution of the two flowers on a branch, the twisting of one was to the right, the other to the left. My own subsequent observations confirm hers. I have to add the following notes:

It will be remembered that the inflorescence is of the definite kind, one flower terminating the stem but pendant; the other axillary to a small foliaceous bract and raised on a longer peduncle than the really older flower. In point of fact, the two flowers have nearly coincident anthesis. In all cases that I have examined the æstivation differs in the two blossoms as Miss Chace observed, but sometimes it is the terminal, sometimes the axillary one that is dextrorse, the other always reversing the direction. Again I find that of a number of flowering branches examined, about an equal proportion fall under one or other of the above heads, *i. e.* sinistro-dextrorse or dextro-sinistrorse. I coin terms to express my meaning. In all cases there is a distinct

difference in the direction of convolution of any two blossoms of the same branch.—W. W. Bailey.

P. S. I find, upon consulting LeMaout and DeCaisne under *Sterculiaceæ* two diagrams of *Hermannia* are given, the one "twisted to the right," the other to the left. It is not spoken of in the text.—W. W. B.

Recent Publications.—*American Journal of Science and Arts*, May. —Dr. Leo Errera, in Belgium, has been investigating some Pentstemons and has come to the conclusion that the principal function of the sterile filament is to obstruct the access of unwelcome insects to the nectar at the base of the flower.

American Naturalist, May.—In regard to the self-fertilization of plants the conclusions of the Rev. Geo. Henslow are given as follows: "1. The majority of flowering plants can, and possibly do, fertilize themselves. 2. Very few plants are known to be physiologically self-sterile when the pollen of a flower is placed on the stigma of the same flower. 3. Several plants are known to be morphologically self-sterile in that the pollen cannot, without aid, reach the stigma, but is effective on that of the same flower. 4. Self-sterile plants from both the above causes can become self-fertile. 5. Highly self-fertile forms may arise under cultivation. 6. Special adaptations occur for self-fertilization."

Ferns of North America. Parts 14 and 15.—This number contains *Aspidium Goldianum*, Hooker, *A. Filix-mas*, Swartz, *Polypodium pectinatum*, L., *P. Phyllitidis*, L., *Pellæa Bridgesii*, Hooker, *P. Breweri*, Eaton, *Notholæna tenera*, Gillies, *Dicksonia pilosiuscula*, Willd., (*D. punctilobula*, Kunze.), *Cheilanthes tomentosa*, Link, and *C. Eatoni*, Baker.

Journal of Botany, British and Foreign.—On the Sources of the China Matting of Commerce. In addition to the matting used for sails, Canton and the large district city of Tung-kun are the seats of an extensive manufacture of floor-matting, almost all of which is exported to the United States. The plant from which it is woven is *Cyperus tegetiformis*, Roxb.

The third part of Prof. Beccari's *Malesia* describes five new species of *Osmoxylon* and nine of *Rhododendron*. Three species of *Nepenthes* are found in New Guinea. But the most interesting plant figured and described is *Corsia*, from the north coast of New Guinea; it is a small aphyllous parasite, with a scaly stem bearing a single terminal flower. It may form the type of a new Natural Order *Corsiaceæ*. Parts 80 and 81 of the *Flora Brasiliensis* were issued in December, 1878. In the proceedings of the Linnean Society of London, there

was exhibited a drawing, natural size, of one of the remarkable crimson-colored pitchers of *Nepenthes sanguinea* from Malacca; this cylindrical pitcher measured twelve inches long and nine inches in circumference. In a paper on Inflorescence, Dr. Maxwell Masters, discusses schemes of classification and proposes a rearrangement under the heads of *monopodial* or indefinite, *choripodial* or dichotomous and *pleiopodial* or definite.

United States Species of Lycoperdon, by Chas. H. Peck. A. M.—The nature and object of this paper cannot be given better than in the prefatory note of its author. "The literature of the puff-balls of the United States is very much scattered and in some instances scarcely accessible, the descriptions are often imperfect and unsatisfactory and the technical terms employed in describing the species are scarcely intelligible, without explanation, to any except mycologists. It has therefore seemed desirable to bring together the descriptions of all our species, so far as known, and, for the purpose of rendering them more satisfactory and intelligible to the general reader, to remodel them, giving them more uniformity of style and more completeness of detail and employing the strictly technical terms only after having given an explanation of their meaning. Besides this the specific descriptions have been supplemented by remarks upon the general and more obvious characters, and the distinguishing features of such species as are closely allied and liable to be confused have been specially mentioned. It is believed that the species thus described can be identified without the aid of a microscopic examination of the spores, but for the sake of completeness the spore characters have been given in all cases in which they were ascertainable." It seems that we have nineteen species of *Lycoperdon*, and with this paper as a guide it also seems that any one ought to be able to distinguish them.

Gramineæ, by Geo. Vasey, M. D.—Although there is no statement of the fact we judge that this handsomely printed pamphlet is an extract from the final report on the Botany of the Wheeler Survey. Dr. Vasey has long had a fondness for the grasses and has here made a careful and full report. Descriptions are given of all grasses not described in easily attainable reports, and references indicate plates, though none appear in this extract. Of the 122 species catalogued four are described as new, *Vilfa minima*, *Poa Wheeleri*, *Festuca Thurberi* and *Trisetum Wolfii*, the last being dedicated to the indefatiguable collector of the expedition.

Descriptions of some new species of North American Mosses, by Leo

Lesquereux and Thos. P. James, with a supplement by W. P. Schimper.—In the prefatory note it is said that the new species of mosses described have been received from various sources since the death of Mr. Sullivant and the publication of the Supplement to the Icones Muscorum. On a recent visit by Mr. James to Europe, he took with him not only specimens of these species, but also of many of those recently described as new in the scientific periodicals of this country, for the purpose of critically re-examining the whole in co-operation with Prof. W. P. Schimper, of Strasburg. Seventeen species are described, ten of which come from the south, seven being from Florida.

Characeæ Americanæ, by Timothy F. Allen, A. M., M. D., Part I.—This consists of a handsome colored plate of *Chara gymnopus*, A. Br., var. *elegans*, A. Br., with a page of letter press. It is well executed and we hope that other parts will speedily follow.

Catalogue of the Flowering Plants, Ferns and Fungi growing in the vicinity of Cincinnati, by J. F. James.—This catalogue is from the Journal of the Cincinnati Society of Natural History, April, 1879. The list of Fungi has been taken from Mr. Lea's catalogue, published in 1849, and now out of print. Part of the nomenclature has been brought up to date, Watson's Bibliographical Index being followed as far as published. Through Filices, 898 species are listed. To this is added Lea's catalogue of 319 Fungi, making quite a respectable showing for Cincinnati botanists. Future investigations may yield many more species and some may need to be verified, as for instance *Cyperus Lancastriensis*, Porter. *Carex Muskingumensis*, Schw. should have been written *C. arida*, Schw. & Torr. and some other names after *Compositæ* might have been changed, but the catalogue is a good one and is a step in the right direction.

Bulletin of the Torrey Botanical Club, April.—C. F. Austin in his notes on Hepaticology describes nine new species of Liverworts. Under the title of "New or little-known Ferns of the United States," Prof. D. C. Eaton gives *Adiantum tenerum*, Swartz, *Pteris Cretica*, L., *P. serrulata*, L. fil., *Asplenium ebeneum*, var. *proliferum*, and *Ophioglossum vulgatum*, Plumier.

C. F. Wheeler reports growing near Hubbardston, Michigan, *Draba Caroliniana*, Walt., and *Utricularia resupinata*, Green, neither of which have been before noticed in that state.

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Some Florida Ferns.—*Acrostichum aureum*, L. Gathered from a salt water creek twenty miles south of St. Augustine, the only locality of which I know as being any where near St. A. The fronds grow from a root-stock which is permanently in the water, and were just far enough from the steep slippery wire-grass-covered bank to make them hard to obtain. I could not reach them, so managed in this way: one of my companions seated herself on the ground behind me as I sat on the edge of the bank, and grasped my dress firmly with one hand, while with the other she took good hold upon a well-rooted Palmetto bush growing a little back of her. My other friend used a ten-foot pole to poke the ferns within my reach, and I grasped frond after frond by its tip, cut it off as low down as I could reach with my big knife and tossed it over my shoulder, not daring to turn my head to see where it went lest I should lose my balance. Just below me was the deep creek, whose quiet muddy waters were the home of *alligators*, and I did not wish to get too close to the creatures! The fronds are from three to ten feet high, generally in salt marshes or creeks, very seldom growing elsewhere. When Mr. J. Warren Merrill was here, he said (if I remember rightly), that this fern would grow well in his greenhouse, but did not fruit. Might not the absence of salt water account for this? Season of fruiting from August to September, perhaps longer. This *Acrostichum* is easily killed by frost, and the severe weather during the past winter killed the Halifax River fronds, and, I presume, those in my locality, though I have been unable to learn about it yet. The stipes are very succulent, sometimes over an inch in diameter at base. I think my estimate is very moderate, but naturally I could not pay much attention to stipes from my elevated situation when collecting!

Polypodium incanum, Swz. is a hardy little sprite and makes its home on the ground, on trees and on roofs of old houses. This fern is very common on Live Oak and Hickory trees, and I have one from an orange tree. I think fruited fronds may be found at any season. Their ordinary length is from two to six inches. While botanizing near Daytona, Fla., some time ago, I collected some specimens from a prostrate log which were so large that my first thought was of *P. vulgare*, which I have never seen in Florida. When growing on

houses, the *incanum* makes clumps or masses, from the snarling of the root-stocks, I suppose. It is usually called the "Resurrection fern" because it dries up, and then freshens again when wet. I used to be very much interested in watching an old roof which was partially covered with it. In dry weather it was as neutral tinted as any other old shingle-roof, but after a shower, it showed a bright fresh green fern-garden!

Polypodium pectinatum, L. is well established on the banks of a deep, wide ditch at Daytona. This ditch or "canal" was made to drain a hummock land a half mile or more back from the river, and is well shaded by the underbrush and large trees growing all around. The *P. pectinatum* fronds fruit sometimes when only two inches in length, but generally they are from 6–33 inches long and heavily fruited. I have found them growing on old logs, but, except one plant at the base of a tree-trunk, never on *living* trees. On the contrary, as far as I know, *P. Plumula* grows ordinarily upon live trees; I have never seen it upon the ground, and only once on a prostrate log. My specimens of *P. pectinatum* are all from the Halifax river. I have lately learned of a locality about twenty-six miles south of St. A., which I hope to visit this summer.

P. Plumula, Willd. possesses the same power of drying and freshening, that the *P. incanum* has. I find it difficult to keep the color of this little fern, as it is apt to turn brown within a few weeks after pressing. Although I have had a hundred and twenty or more fronds, I have not yet gathered a score of fruited ones, and judge that fertile fronds are scarce. In drying up on the trees, the incurved pinnæ of *P. incanum fold face to face* so as to bring the smooth upper surfaces together, while the frond shows a decided tendency to curl up from tip toward base. This position makes the scurfy-scaled under sides of the pinnæ very marked, and the little fern is quite comical in its entirely *shut-up* aspect. The *Plumula* fronds are very curious in their dried-up state. The rhachis takes a backward bend above the middle as if to prepare for coiling; this curve, ending in the recurved tip of the frond, is strongly suggestive of the graceful curve of the swan's neck. Each pinna rolls up tightly from its tip toward the rhachis, making about three turns; the under side with its dark midrib is thus brought into notice. In opening, the pinnæ nearest the base unroll first, continuing up the stalk.

The *P. Plumula* grows on living trees in deep forests about fourteen miles west of St. Augustine. It may be common, but I have never found it anywhere else, excepting one plant which I saw in the In-

dian river country. Possibly this very habit of drying up may be the reason why it is not often seen. The fronds are from 2 to 15 inches long, and 1 to 1½ broad.

Polypodium aureum, L. This fern is more common than *P. Plumula* or *P. pectinatum*, growing on the trunks of Cabbage Palmetto trees. It is found near St. Augustine, and on the banks of the St. Johns, Halifax and Indian rivers. It is scarce about St. A. because these fires in the woods, so terrible to a botanist, burn off everything growing on the trunks of trees, but do not necessarily destroy the trees. The country people are in the habit of setting the pine barrens on fire so that the fresh green grass may spring up for pasturage. This is nice for the cattle, but miserable for the plants. The fern fruits at all sizes; some of my specimens are but 6 inches long, some are from 3–4 feet. The handsome brown chaffy root-stock is very thick, and often shows the scars from which the old fronds have fallen. From this I judge that the stipe is articulated with the root-stock. This is a very beautiful majestic fern, and though "associated always with the Cabbage Palmetto" when wild, it bears very well to be planted in the fernery or flower-pot. It seems to be a very slow grower; some root-stocks planted in this way were three or four months in putting out their first leaves, but afterwards grew much faster. I was much interested last December while at Daytona, in collecting the different forms and gradations of the *P. aureum* from the delicate simple frond up through the once or twice lobed shapes, till at last the perfect frond appeared. Sometimes these grew on separate root-stocks, sometimes all upon one. These first forms are much more delicate and thinner than the perfect ones. Some mature fronds showed very emarginate tips of the pinnæ, whereas they are usually very acute. Occasionally a lower pinna is plainly one or two lobed, and sometimes specimens show double rows of fruit-dots.

Polypodium Phyllitidis, L. I never found this fern north of the Indian river, and saw but little of it there. It grew on old decayed logs in deep rich woods. The fronds often show a tendency to develop one or two lobes, or to have wavy outlines. A few weeks ago a letter from Mr. F. A. White, who lives on the Indian river, called my attention to the fact that on old fronds of *Phyllitidis* new fruit-dots were appearing after the old ones had dropped off. This led to an examination of my own living plants, and I found several fronds had the rows of little round dots showing where last season's sori had been, and were now putting on fresh white dots directly over the old ones! This was a fern practice with which I was entirely unacquaint-

ed, and which surprised me very much. The fronds which are acting in this queer way are old mature fronds of last year.—Mary C. Reynolds.

A Michigan Trillium.—Five or six years ago, I found a single *Trillium*. The petals were white with a greenish stripe through the center, obovate-mucronate in outline. The plant seemed specifically different from other members of this genus, but, search failing to reveal any more, I considered it, for some time, as merely a curious sport—a sort of *lusus naturæ*. The next year I found more of them, and have continued to find more or less every year since. Several of my friends have also met this plant in their collecting. I am now inclined to think it is rather widely distributed in Michigan; and the facts I have gathered concerning it seem worth recording.

The typical form of this plant is about the size of *T. grandiflorum*, Salisb., blossoms at the same time, and is sometimes found growing with it. The leaves are broadly-ovate, acuminate-pointed, and resemble those of *T. grandiflorum*, but are long-petioled; the petals are large, obovate-mucronate, white with a narrow or wide green stripe; the ovary is green, elongate, tapering into the styles, and round, or obscurely three-sided; the ovules are sometimes 12 in number, but generally less, often none, or only one or two, the cavity being filled by an enlarged placenta.

I have not raised plants from the seed, nor can I say, positively, whether it matures seeds. My impression is that the plant fruits sparingly.

The variations from the common form are quite remarkable. Specimens have been found with leaves not distinguishable from those of *T. grandiflorum*; others, with leaves reduced to mere stubs, ⅛–¼ of an inch long. Sometimes two leaves of the whorl will be thus reduced, and the other, of normal size and shape. Often the leaves are entirely wanting, in which case the calyx is generally larger and performs the function of leaves. Flowers showing all sorts of grades between the typical form and genuine *T. grandiflorum* also occur. Individuals with the white petals and six-angled ovary of the latter in connection with long petioled leaves have been seen; also, forms with sessile leaves, six-angled ovary, and greenish, green-striped, or wholly green petals; also, green-striped petals and elongate ovary—not angled—along with sessile leaves. The shape of the petals varies, and they are, indifferently, smooth or wavy. As before stated, when the stem is leafless, the calyx is commonly enlarged to take the

place of leaves. In like manner, the corolla is sometimes changed into good looking and apparently serviceable leaves.

Monstrous forms are not rare, as for instance;—stamens and styles converted into leaves, some of the former retaining a trace of the anther on the edge of the leaf; styles enlarged and leafy, sometimes antheriferous; calyx large and the other floral organs abortive, or reduced to Liliputian dimensions; stamens double the ordinary number, &c.

In casting about for a *specific* description, no permanent character could be found. The petioled leaves, green-striped petals, and round, or obscurely three-sided ovary would offer a good specific character, were they constant; but such is not the case. The plant seems more than a sport and less than a species. If it is simply an abnormal form, as the appearance of the ovary would seem to indicate, the question arises: Why should it occur every year? Sports are generally rare and do not repeat themselves, or but to a limited extent. This plant is common and well distributed. My present opinion, formed from a careful examination of many specimens gathered at different times and in various localities, is that the plant in question is a variety of *Trillium grandiflorum*. The ordinary form does not greatly resemble the latter, but the intermediate forms above noticed apparently show a connection between the two. It is barely possible that the plant may establish a claim to consideration as a species,—the intermediate forms being hybrids. It is desirable that those who have met this variety should watch its behavior, and ascertain whether the ovules develop into good seeds. For the present, the plant might be dubbed *T. grandiflorum*, var. *variegatum*, or something like that.—Erwin T. Smith, *Hubbardston, Mich.*

Notes from West Virginia.—From all that can be learned by means of published reports, very little collecting has been done in West Virginia, if we except the work of Mr. J. F. James, of Cincinnati, who spent some time at the famous "Hawk's Nest," on the New River. Although the results of a week's work are necessarily small, they may possibly add something to our knowledge of the geographical distribution of the North American flora and the knowledge of the topography of the region traversed by the Great Kanawha and New Rivers, should certainly have some influence in inducing more thorough exploration. The scenery in these valleys is almost sublime—and wherever there is grand scenery it is usually a fine place for the labors of a botanist. From the mouth of the Great Kanawha

to its junction with the Gauley River the hills rise on either side higher as the distance from the mouth increases, until they fairly earn the title of mountains. At the confluence of the Greenbrier and New Rivers the mountains recede to left and right in the Flat Top and Greenbrier ranges, the latter sharply defining the course of the Greenbrier River while the New comes through the numerous chains—collectively the Alleghanies—between the Blue Ridge and the Cumberland Mts. The whole region is wild beyond description. The hills along the Kanawha are densely wooded with beech, ash, oak, walnut and tulip, interspersed with patches of pine and cedar. Deep rugged ravines run back from river to hill-top, the work of the torrents of the Quaternary. These valleys are easy of access by means of the Chesapeake and Ohio R. R. which, commencing at Huntington on the Ohio River, passes up the Kanawha and New Rivers as far as the Greenbrier, where it branches off and passes out of West Virginia near the White Sulphur Springs. I can think of no more desirable botanical tour, in which cheapness is an object, than to take the Chesapeake and Ohio R. R. at Huntington, spend a week or two at Charleston, Kanawha Falls, Hinton, Hawk's Nest and White Sulphur, with short side trips to desirable points by local conveyances. The limited time spent at Charleston gave promise of many good things if we had only had an opportunity to prosecute our labors at greater length. Many of the dry banks were covered with *Aristida oligantha* and *Arenaria serpyllifolia*. In a clump of pines we picked *Silene Virginica*, *Tradescantia Virginica*, *Pentstemon pubescens*, *Pinus rigida* and the rarer one *P. pungens*. Along shaded hill-sides was *Rosa lucida* and climbing over the low shrubs, *Smilax glauca*. The dry grade of the C. & O. R. R. abounded in stunted specimens of *Geranium Carolinianum* and *Trifolium procumbens* while on the adjacent hill-sides were much larger and finer individuals showing the beneficial influence of shade and moisture. A deep shady gorge yielded such species as *Kalmia latifolia*, *Magnolia Umbrella*, *Cedronella cordata*, *Fragaria Indica*, *Ilex opaca*, *Azalea viscosa*, *Scutellaria galericulata* (white), *S. serrata*, *Asclepias quadrifolia*, *Polypodium vulgare*, *Asplenium ebeneum*, *Aspidium marginale*, *Ligustrum vulgare*, etc. These are enough to indicate the character of the flora, and make us wish to spend the season in roving these coal valleys and romantic hills.

C. R. B.

On the Self-fertilization of Plants.—In the American Journal of Science and Arts for June, Dr. Gray gives the following review of Rev. Geo. Henslow's paper on the above subject:

This paper is elaborate, mostly able as well as ingenious, in all respects considerable, and unconvincing. Its thesis is, the Darwinian "Nature abhors perpetual self-fertilization," read backward. It concludes that, "not only are the majority of plants self-fertilizing, but that those which are exclusively so propagate abundantly and with extraordinary rapidity, are best able to establish themselves in foreign countries, as, being quite independent of insects, they run no risk of extermination on that score; . . . that, so far from there being any necessarily injurious or evil effects resulting from the self-fertilization of plants in a state of nature, they have proved themselves to be in every way the best fitted to survive in the great struggle for life." The hypothesis is also advanced "that they are all degraded forms," and that *therefore* "their ancestral life-history is a longer one than that of their more conspicuous and intercrossing relations." We fail to see how this follows, except upon the assumption that the earliest phænogamous plants had the most highly organized blossoms; and that would not accord with vegetable paleontology.

Mr. Henslow rejoices that he has one staunch supporter; "for, as has been seen, Mr. T. Meehan has arrived at the same conclusion;" and indeed he builds not a little upon facts supplied by Mr. Meehan's observations. He cites the latter's "admirable paper, which was reproduced in the 'Gardner's Chronicle' for Sept. 11, 1875, and is in fact an 'apology' for self-fertilization." As he then marshals twenty reasons for believing particular plants to be normally self-fertilizing, and nineteen "chief facts which may be regarded as occurring correlatively with self-fertilization, some being actual causes which directly or indirectly bring it about," it would appear that it is no longer self-fertilization, but rather the existence and *raison d'etre* of cross-fertilization that stands in need of apology, or of explanation.

He freely concedes that the flowers of many plants, and some whole orders, are so constructed that intercrossing is for them a necessity; also that most of those which are believed "to be normally self-fertilizing" because they can and do fertilize themselves habitually," yet "may in some cases be cross-fertilized by insects." It is admitted that the structure of the latter is *adapted*—most variously and wondrously adapted—to being fertilized by particular insects. As this comes to pass in plants and flowers of the highest organization and greatest specialization, Darwin and his school conclude that this is a most advantageous outcome, and means some real good to the species; that when this is accompanied with a loss of self-fertility, it is the loss of something no longer useful, something better than self-fertili-

ty having taken its place. But Mr. Henslow, reading this the other way, having determined "that self-fertilization is *per se* a decided advantage," and free from injurious liability, comes to regard intercrossing as merely "a compensatory process for the loss of self-fertility."

But how and why did this "compensatory process come to pass? It is conceived on both sides that flowers were "primordially inconspicuous." (To this Henslow adds hermaphrodite and self-fertile; but that need not here come into account.) Both agree that insects have mainly determined their conspicuousness. Darwin says this has been determined through natural selection by the survival of the more and more conspicuous variations, correlated with their producing something good for the insect of which the coloration was a sign, and that the preferential survival of the more showy and attractive was a consequence of some benefit of the intercrossing. Henslow propounds the view that insects have determined the conspicuousness more directly, and not by benefiting but by irritating the flowers. "These, by being greatly stimulated by the repeated visits of insects, tend to become hypertrophied. Hence the corolla enlarges, becomes more brightly colored, the nectariferous organs increase the quantity of secretion, and the stamens develope more pollen. Such being the case, nourishment is withheld from the pistil, which is delayed in its development; consequently such a flower is very generally proterandrous." Mr. Darwin might accept this as an ingenious conception of the way the specialization comes about, still insisting on the advantage of the resulting intercrossing—"or else the thing would hardly come to pass," as the poet has it. And Mr. Henslow's hypothesis has to be supplemented to account for proterogyny, which is not much less common. But Henslow's supposed process works evil instead of good, and is therefore utterly anti-Darwinian and "dysteleological." For the result is a disturbance of the equilibrium and proper correlation between the andrœcium and gynœcium; and this, carried further, should upon this view result in the monœcious and diœcious states. So, accordingly, the cross-fertilization which comes into play in the case of separated sexes, and in that of self-sterile hermaphroditism, is not for any good there is in it *per se*, but because it may no better be. And all the elaborate, exquisite, and wonderfully various modes of adaptation of flowers to insects are only ways of repairing the damages inflicted upon blossoms by insects through their persistent visits! Did Mr. Henslow ever ask himself the question why the sexes are separate in animals?

The conclusion which Mr. Darwin had helped us to reach is, that intercrossing should be regarded as the aim in nature and on the whole most beneficial, and self fertilization as a safe-guard against the risks of crossing; that most hermaphrodite flowers have the advantage of both, the latter for immediate sureness, the former for ultimate benefit. Upon the new view, self-fertilization is the aim and the consummation, and cross-fertilization at best a succedaneum. By it insects may repair the damage they have caused to blossoms through endowing them with "the fatal gift of beauty," and stimulating their organs of secretion; and by it the winds may bring chance relief to those which at length abandoned by their spoilers, have lost this attractiveness and fallen to the degradation of unisexuality. For these last, as has already been stated, are hypothetically regarded as degraded from higher floral types.

We are bound to glance at some of the considerations which are adduced in support of this thesis. They are multifarious and of unequal value. As has occurred in other cases, so here also, the weightiest objections to Mr. Darwin's view are those which he has himself brought out, namely, the fact that, as tested experimentally under cultivation, while some plants are much increased in vigor and fertility by artificial intercrossing, others are not sensibly benefited; and that the benefit derived in marked cases is not cumulative, but reaches its maximum in two or three generations. And even close breeding under cultivation occasionally gives rise to very vigorous and fully prolific self-fertile races. Then many plants are fully self-fertile in nature, and it is not proved that any such have lost or are in the way of losing either fertility or vigor through continued interbreeding. But, before drawing from this the conclusion that cross-fertilization is of little or no account in nature, it should be remembered that bud-propagated races are in similar case. Races exist which have been propagated only from buds for hundreds of years, with seemingly undiminished vigor, and there is no proof that any one has succumbed under the process. But for all that we do not doubt that sexual reproduction contributes something to the well being of the species, besides facilitating its dispersion. Again, no one questions the necessity of fertilization by pollen to the production of embryo in the seed; yet, even in this, the necessity is not so imminent but that some embryos may originate without it.

In short, the facts brought out by Darwin and others, and all the considerations of the present essay, are best harmonized by the conception which the former has consistently maintained, namely, that

an occasional cross suffices to secure the benefit of inter-crossing, whatever that may be. Nothing yet appears which seriously disturbs our conviction that just this is what nature generally provides for.

Mr. Henslow's proposition, "The majority of flowers are self-fertile," is doubtless true in the sense that they are capable of self-fertilization, and is not improbable in the sense that they "can and do fertilize themselves habitually" But his inference that the majority of flowers, or that any flowers, actually propagate for a series of generations by self-fecundation, or that a cross if it occur is "exceptional," and of no account, is surely unwarranted by the evidence which he has adduced.

Occasionally the reported facts will not bear scrutiny. *Gentiana Andrewsii*, it is said, never opens at all in America. It opens in sunshine in the middle of the day here in New England. And while looking at closed flowers we have seen a humble bee emerge from one. We have, in this Journal, shown how it is that self-fertilization is impossible during the first three or four days of anthesis, but neatly practicable afterwards. It is rash to infer (as on p. 330) that papilionaceous flowers which shed their pollen early in proximity to the stigma are therefore self-fertilized. In most of the cases adduced the pollen is not lodged upon the stigma, but upon the style below it, and the adaptations for intercrossing, though the mechanism be different, are as explicit as in the analogous case of Campanula. "Fremont pathetically describes the solitary bee that rested on his shoulder at the top of Pike's Peak." The pathos is wasted as respects all but this particular bee; for the entomologists find that alpine region of the Rocky Mountains to be as well stocked with flying insects as are alpine regions in other parts of the world. They do not superabound, but if from the alpine flora we subtract the evidently entomophilous and the anemophilous blossoms, the remainder will be nearly nil. And as to the correlation of this comparative scarcity of insects with the marked conspicuousness of blossoms, this is the way the lesson is read by a most eminent physiologist: "Even the glowing hue of alpine flowers is accounted for by the attraction which brighter-colored individuals exercise upon the insects, scarce in those heights and necessary for fertilization."

One or two of the author's own observations are perhaps to be revised. "*Gaura parviflora* . . . has no corolla and is cleistogamous, in that it is self-fertilizing in bud, as I found in specimens growing at Kew." Were they not imperfectly developed blossoms, perhaps late

in the season? Here the flowers open freely and have rose-colored petals. If he will examine fresh specimens of *Scrophularia*, it will soon be clear that his idea of their self-fertilization (p. 371) is a mistake. It is a mere slip in the Genera Plantarum through which abortive stamens are attributed to the cleistogamous flowers of *Epiphegus*. The authors evidently meant to describe the case just as Mr. Henslow found it to be, but used a wrong word.

"Weeds are probably all self-fertilizing or anemophilous. A weed is simply an unattractive plant, and possessing no feature worthy of cultivation." It may be as difficult to define "a weed" as to define "dirt." But, turning to the Handbook of the British Flora, we find, as we expected, that the showy Corn Poppy, Cockle, and Larkspur are denominated weeds. Why weeds should possess the vigor and gain the predominance which they do is a large question, to which other solutions have been offered than the one which is in this essay very plausibly maintained. We cannot take up the topic here: but, without acceding to his general proposition, we are much disposed to agree with the author in this essay, as respects some of them, that aptitude for self-fertilization may have given them the advantage which has determined their wide dispersion.

The insistence upon the importance of self-fertilization is what gives this essay its value. As a whole it fortifies the proposition, well laid down by Herman Mueller, which Mr. Henslow cites:—"that, under certain conditions, the facility for self-fertilization is most advantageous to a plant, while, under other conditions, the inevitableness of cross-fertilization by the visits of insects is the more advantageous." But this is not our author's thesis. It comes to this: the plan of nature is either cross-fertilization supplemented by close-fertilization, or close-fertilization tempered by cross-fertilization. As restricted to plants the difference is not wide. Regarded generally, the Darwinian axiom is still best sustained.

Forests of Central Nevada.—In an article on the Forests of Central Nevada, with some remarks on those of adjacent regions, Mr. Chas. S. Sargent, says:

A comparison of the arborescent vegetation of Nevada with that of the region lying directly east and west of the "Great Basin" may be interesting. Such a comparison will serve to more clearly demonstrate the remarkable poverty of the Nevada forests. It will afford, too, another illustration of the relation of moisture to forest distribution, especially with reference to the multiplication of species.

which will be found to increase or diminish as the rain-fall is more or less abundant and more or less equally distributed.

In the territory between the 41st and 37th parallels of latitude, and extending from the eastern base of the Rocky Mts. to the foot of the western slope of the Sierra Nevada are three distinct belts of vegetation. Beginning at the east there is: 1. The Rocky Mountain Region, including, besides the main range, the Uinta and the Wahsatch, and embracing Colorado and the eastern half of Utah; 2. The Nevada Regions, extending from the western base of the Wahsatch, to the eastern base of the Sierra Nevada, and embracing the western half of Utah and the whole of Nevada with the exception of the extreme northern and southern portions of the State; 3. The Sierra Nevada Region.

In the Rocky Mountain Region, to which in spite of its mid-continental position considerable moisture is attracted by the high peaks which everywhere dominate it, there are 25 trees and 48 shrubs, in all 73 species. In the Nevada Region, where, owing to its isolated position between high mountain ranges, the rain-fall is small and very unequally distributed the number of species is reduced nearly one-half—to thirty-eight; ten trees and twenty-eight shrubs. In the Sierra Nevada Region, to which the Pacific contributes a large although unequally distributed, snow and rain-fall, the number of species is increased to 89; of these 35 are trees, or 3½ times more than occur in the adjoining Nevada Region, and a third more than are found in the Rocky Mountain Region; and 54 are shrubs, or double the number of the Nevada Regions.

The absence of arborescent and frutescent *Leguminosæ* from the three regions, when herbaceous genera of this order are so largely represented, is remarkable, especially as they abound farther south in New Mexico and Arizona. In the Rocky Mt. Region there is a single representative of this order, a *Robinia* nearly allied to those of the Eastern States; in the Nevada Region there is not a single frutescent *Leguminosa*, and in the Sierra Nevada but one species, a large shrub *Cercis*. On the contrary the number of genera of frutescent *Rosaceæ*, many of them endemic and monotypic, is very large in proportion to other *Angiospermæ*. In the Rocky Mt. Region there are 13 genera with 15 species; in the Nevada Region 7 genera with 10 species; in the Sierra Nevada Region 11 genera with 13 species; in all. 14 genera with 28 species. In all the United States east of the Mississippi River there are but 10 woody Rosaceous genera, all represented in our three Regions with the exception of the Southern *Chrysobalanus* and *Neviusia*.

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EDITORIAL.—There are times when an editor needs to say a few words face to face with his patrons, and we conceive this to be one of those times. We fear that since the GAZETTE has been growing in size and favor we have lost some unpretentious notes and contributors that we were in the habit of having when it was limited to four pages and a small subscription list. The subscription list is still small enough, too small in fact, but the pages are more numerous, not to repel notes but to attract them. It is a mistaken idea that we now want only articles that are regular monographs, containing days and weeks of study, for we are still after the short notes, not containing so very much in themselves, but in the aggregate making a spicy and interesting journal. A magazine should contain not only the heavy and solid matter fit for students to bother their brains about and the ordinary reader to lay aside in despair, but it should also contain the froth and sparkle of spicy notes that any one can read with interest. A prime rule in writing to interest is to be brief. Condense what you have to say in a few words and give us the cream, we have no time to drink the milk. One hundred persons will read a short note when only one will read it if thinned out and spread over a greater surface. Even so scientific an observer as Draper had to be blamed for his wordy style in recording his results. It will be remembered that when he studied the assimilation of plants by means of the spectroscope and published his results, grand as they were, Dr. Gray, in reviewing the paper, felt compelled to say that the whole subject was like an omelette in which Senebier furnished the egg, DeSaussure the milk and Draper the intumescence. We hope our readers now will all send us some short, pithy notes and by this interchange of courtesies they will all be pleased. We mean simply to act as a medium through which our subscribers may talk with one another, a sort of monthly telephone —and not a machine to grind out articles for their benefit. We can fill the GAZETTE, there is no trouble about that, but we want more variety.

Who Finds White Partridge-berries?—So far as we know, or ever heard of, only Miss Kate Fisher Kurtz, of York, Penn., who sends us fresh plants. The berries are as white as those of *Chiogenes*, and form a fine contrast with the red ones. It was found in a single patch, in the midst of the ordinary form. The albinism affects even the corolla, the tip of which in bud lacks the purple or rose tinge of the ordinary buds.—A. Gray.

Salix balsamifera, Barratt, = S. cordata, var. balsamifera, Hook., an older name for S. pyrifolia, Anders.—It is an interesting fact, proven by a specimen preserved in the Herbarium of the Philadelphia Academy, that this Willow was collected "on the banks of the Ammonoosuck, White Hills, New Hamsphire," by Mr. H. Little, as long ago as 1823! Occurring mainly between New Brunswick and Lake Winnipeg—a geographical representative of *S. pyrolæfolia* of a corresponding distribution in Eastern Siberia—it is remarkable that this species has been so rarely found within our northern boundary. Only two stations can be recorded, viz; the one above mentioned, which Mr Pringle is confident will be rediscovered; the other near Flint, Michigan, where Dr. D. Clarke collected specimens a few years ago, but unfortunately the plants were destroyed soon after; the besom of agricultural improvement sweeping so clean that not a vestige, root or branch, was left. Doubtless other localities will be found, especially in the cold peat bogs of northern New England along the St. John, in northern Michigan, &c., and it appears desirable, therefore, that a species coming more and more into notice as an addition to our Flora of the Northern States, should receive without further delay its older and rightful name of *S. balsamifera*, Barratt. Conscious that the opinion of an amateur, a mere private in the ranks (and not of the "regular service" at that), must in itself carry little weight as opposed to the *ipse dixit* of a botanist of the commanding position and commanding ability of Prof. Andersson I may be pardoned, I hope, for strengthening my assertion by the following statement of facts.

In the Columbia College (Torrey) Herbarium there is luckily a fasciculus marked in the handwriting of Dr. Torrey, "Ex herb. Hooker. Willows from British America studied and named by Dr. Barratt before the publication of that portion of the Flora Boreali-Americana containing the *Salices*." The tickets are in the handwriting of Dr. Barratt. No. 53 of this collection comprises the following specimens, viz: mature leaves from "Cumberland House, *Drummond*"; fertile

aments from "Lake Winnipeg, *Richardson*." These specimens although brought together from widely sundered stations, are rightly mated even to the mature leaves, and show that the character of the species was clearly understood; they represent *S. balsamifera*, Barratt, so completely in flower, fruit and foliage that there can be no room for doubt as to what Dr. Barratt regarded as the type of his species; and furthermore there is just as little uncertainty that *S. pyrifolia*, Anders. is a recent name for the same plant.

It is to be regretted that after so clearly indicating a distinct species Dr. Barratt—in his desire, I imagine, to dispose in some way of all the material placed in his hands—should have followed his type specimens with leaves only of *S. discolor* from "Cumberland House: *Drummond*" as "54 var. *intermedia*"; and leaves only of *S. petiolaris* as "55 var. *angustifolia*." But it is a rule that the including under varieties what belongs to other species does not affect the validity of the species itself, and it should be borne in mind that while the type specimens present a complete and unmixed series of flowers, fruit and leaves, the varieties so-called are shown by *leaves only*. That *S. balsamifera* must have been represented by equivalent specimens in the Hookerian herbarium goes with the saying, otherwise the reduction to *S. cordata* in the Flora Boreali-Americana becomes *absolutely inexplicable*. Yet Andersson in his *Salices Boreali-Americanæ*, p. 20, remarks, "*Quantum e specimini*bus in herb. Hook. judicare possum *S. balsamifera*, cujus ramus foliis tectus tantum adest, ad *S. acutifolium*, W., pertinet." And he then goes on to describe the leaves as about 4 inches long, ½ an inch wide, sharply serrate, etc. Now there is *only one such specimen* in the Kew herbarium and that is like No. 55 above mentioned; leaves only of *S. petiolaris* and marked "B"; the rest are all (for there is no equivalent of No. 54 in the Kew set) designated as the typical forms of *S. balsamifera* and on the sheet is written "*S. cordata*, fide Andersson, 1857." The leaves vary from an inch to 1½ inches in width and are very similar to forms collected by the Rev. James Fowler in New Brunswick.

A friend, whose opinion is entitled to the utmost consideration, has suggested that the Kew specimens were probably returned before Andersson recognized in the collections of Bourgeau his *S. pyrifolia* and that Barratt's No. 53 was overlooked or forgotten. Still in this view of the case it is strange that we have a description in detail of the leaves of *S. petiolaris* in the Kew herb., and finally a reduction of *S. balsamifera* to *S. discolor* (in DC. Prod.) and never a word regard-

ing the full type series of specimens; for if these were known to the author, and deemed *S. cordata* in 1857, it would naturally be supposed that *S. balsamifera* would be left where it was placed by Hooker, even if the same plant were on another page described as a new species. It is clear that in restoring Barratt's name we are simply doing what Prof. Andersson would, or should, have done had not this oversight occurred.

P. S. I have just received a letter from Mr Pringle announcing the discovery of *S. balsamifera* in the White Mountains; not, however, on the banks of the Ammonoosuc, where search was first made in vain, but on the Saco, where specimens were collected June 13th, having immature fertile aments and the characteristic Amelanchier-like leaves.—M. S. Bebb.

Carex comosa. Boott.—On the 5th of July I collected, in the edge of the salt meadows, near Newark, N. J., a single specimen of a remarkable abnormal form of *Carex comosa*. The upper part of the culm is very slender, and bears three sessile spikes, each subtended by a long, very slender bract. Spikes four to eight inches apart, all pistillate except at the apex, where they have empty staminate scales. Upper spike loosely compound, its divisions sessile, and subtended by long (some 1½ inches) bristle shaped bracts, these becoming successively shorter, as their spikelets decrease in size, until they pass into the ordinary scales of the spike.—H. H. Rusby.

Potamogeton.—By the will of the late Dr. J. W. Robbins, of Uxbridge, Mass., all his collections of the genus *Potamogeton* have been sent to Rev. Thos. Morong, of Ashland, Mass., for arrangement and distribution. Mr. Morong is preparing not only to do this but proposes to do some work of revision. As this will be of great use we would urge that botanists over the country send Mr. Morong specimens of the species for examination, especially any unusual forms, as a good deal of new material is already in hand for a general revision of the genus.—J. M. C.

Dichogamy in Rhododendron maximum.—The writer does not know whether the above fact has been recorded or not, but it may be news to some. It was noticed this year in a study of the above species that the stamens mature first and are ready to shed their pollen before the pistil is even stigmatic. After a while the pistils mature and receive their pollen from other flowers through the agency of insects.—J. M. C.

CHANGES IN THE NOMENCLATURE OF POLYPETALÆ.—For the convenience of botanists who have no access to Watson's Bibliographical Index of the *Polypetalæ* we publish the following important changes in names. There are numerous changes in authorities also, but these are omitted.

Clematis cylindrica, Sims. = *C. crispa*, L.

Anemone Caroliniana, Walt. = *A. decapetala*, L.

Anemone Pennsylvanica, L. = *A. dichotoma*, L.

Hepatica triloba, Chaix. = *Anemone Hepatica*, L.

Hepatica acutiloba, DC. = *Anemone acutiloba*, Lawson.

Ranunculus divaricatus, Schrank. = *R. aquatilis*, L., var. *stagnatilis*, DC.

Nuphar luteum, Smith, var. *pumilum*, Gr. = *N. pumilum*, Sm.

Cardamine rhomboidea, DC., var. *purpurea*, Torr. = *C. rotundifolia*, Mx.

Arabis hesperidoides, Gr. = *Thelypodium pinnatifidum*, Watson.

Solea concolor, Ging. = *Ionidium concolor*, Benth. and Hook.

Drosera longifolia, L. = *D. intermedia*, Drev. and Hayne, var. *Americana*, DC.

Hypericum prolificum, L., var. *densiflorum*, Gr. = *H. densiflorum*, Ph.

Vaccaria vulgaris, Host. = *Saponaria Vaccaria*, L.

Lychnis vespertina, Sibth. is omitted.

Sagina subulata, Wimmer = *S. decumbens*, T. & G.

Spergularia rubra, Presl. var. *campestris*, Gr. = *Lepigonum rubrum*, Fries.

Spergularia salina, Presl. = *Lepigonum salinum*, Fries.

Spergularia media, Presl. = *Lepigonum medium*, Fries.

Spergularia media, Presl. var. *macrocarpa*, Gr. = *Lepigonum medium*, Fries., var. *macrocarpa*, Gr.

Oxalis stricta, L. = *O. corniculata*, L., var. *stricta*, Sav.

Xanthoxylum Carolinianum, Law. = *X. Clava-Herculis*, L.

Vitis bipinnata, T. & G. = *V. arborea*, L.

The specific names of *Rhamnus* are made feminine.

Frangula Caroliniana, Gr. = *Rhamnus Caroliniana*, Walt.

Ceanothus ovalis, Bigel. = *C. ovatus*, Desf.

Æsculus Hippocastanum, L. is omitted.

Psoralea floribunda, Nutt. = *P. tenuiflora*, Ph.

Lespedeza procumbens, Mx. = *L. repens*, Barton.

Lespedeza violacea, Pers. var. *sessiliflora*, Gr. = *Lespedeza reticulata*, Pers.

Lespedeza capitata, Mx., var. *angustifolia*, Gr. = *L. angustifolia*, Ell.

Cassia obtusifolia, L. = *C. Tora*, L.
Spiræa opulifolia, L. = *Neillia opulifolia*, B. & H.
Dryas integrifolia, Vahl. = *D. octopetala*, L., var. *integrifolia*, Cham. & Schlect.
Potentilla paradoxa, Nutt. = *P. supina*, L.
Dalibarda repens, L. = *Rubus Dalibarda*, L.
Rosa lucida, Ehrhart (Gr. Man. p. 158) should be *R. lucida*, Pursh, which is now *R. parviflora*, Ehrh.
Rosa nitida, Willd. is a distinct species.
Cratægus tomentosa, L., var. *mollis*, Gr. = *C. subvillosa*, Schrad.
Amelanchier Canadensis, T. & G., var. *alnifolia*, T. & G. = *A alnifolia*, Nutt.
Ribes hirtellum, Mx. = *R. oxyacanthoides*, L.
Philadelphus inodorus, L., var. *grandiflorus*, Gr. = *P. grandiflorus*, Willd.
Sullivantia Ohionis, T. & G. = *S. Ohioensis*, T. & G.
Fothergilla alnifolia, L. f. = *F. Gardeni*, L.
Epilobium angustifolium, L. = *E. spicatum*, Lam.
Epilobium alpinum, L., var. *majus*, Vahl. = *E. origanifolium*, Lam.
Œnothera biennis, L., var. *Oakesiana*, Gr. = *Œ. Oakesiana*, Robbins.
Œnothera riparia, Nutt. = *Œ frutieosa*, L., var. *linearis*, Watson.
Œnothera linearis, Mx. = *Œ. frutieosa*, L., var. *linearis*, Watson (in part.)
Œnothera chrysantha, Mx. = *Œ. pumila*, L.
Ammannia Nuttallii, Gr. = *Didiplis linearis*, Raf.
Conioselinum Canadense, T. & G. = *Selinum Canadense*, Mx.
Zizia integerrima, DC. = *Pimpinella integerrima*, Benth & Hook.
Sium lineare, Mx. = *S. cicutæfolium*, Gmelin.
Sium angustifolium, L. = *Berula angustifolia*, Koch.

Starch in Chlorophyll.—It is very easy to prove the existence of starch in chlorophyll. Let the green color be destroyed by immersion in alcohol, or by any other bleaching process; then soak the specimen a few moments in Potassium Hydrate to destroy the protoplasm. Testing with iodine the chlorophyll grains immediately assume the characteristic blue tint of starch, especially in the guardian cells of the stomata. Such a neat experiment, having so much bearing on the question of assimilation, should be performed by every botanist interested in vegetable physiology.—J. M. C.

The Botanical Text-book, 6th edition, Part I, Structural Botany, by Asa Gray, LL. D., Ivison, Blakeman, Taylor & Co., New York

and Chicago.—The publication of a new work by Prof. Asa Gray, and the volume before us is in effect new, is always a matter of congratulation to botanists. The present book while especially valuable to teachers of our science, should also be possessed by every student who wishes to keep informed as to the latest discoveries, hypotheses and theories. From the first line to the concluding paragraph one feels that he is guided by a master. We find here that grace of style and conciseness of expression which mark all our author's other writings. He brings to the consideration of the subjects herein embraced the experience of a life-time. What other man could do the work so well? This is the sixth edition of the well-known Botanical Text-book, of which the first was published in 1842, the fifth in 1857. We might almost say that every edition marks an epoch in the progress of science. We need not emphasize the strides that have been made since 1857, a period just preceding the publication of the Origin of Species. And in this connection, as one naturally turns to the portions of a work to which he knows the author has given particular attention, we would advise our readers to peruse the exhaustive chapters on Classification, and on Adaptations for Intercrossing.

The author informs us in his preface that this edition has been entirely re-written. Every line shows careful thought and study. The book has outgrown its original scope, and instead of one volume we are now to have four. The first treats of Morphology, Taxonomy, and Phytography, and is enriched, moreover, by a copious glossary of botanical terms. It is profusely illustrated, and while the old figures appear we have in addition many new ones. These are all that they should be, graceful, characteristic and demonstrative. Prof. G. L. Goodale is engaged in the preparation of the second volume, which is to consider Vegetable Physiology and Anatomy. It will indeed be a handbook of these too much neglected branches, in which Dr. Goodale has achieved great distinction as experimentalist and teacher. The third volume, an introduction to Cryptogamous Botany will be by Prof. Farlow, and the fourth and concluding one Dr. Gray writes, "The present author may rather hope than expect himself to draw up." This will be on the Morphology and Economic Use of the Natural Orders of Phaenogamous Plants.

Here then we have the beginning of a work which when completed will be an absolute necessity to every botanist. Each part is entrusted to a specialist, and each of the co-workers has the advice and assistance of the others. Throughout the whole we may expect to note the guiding spirit, the acute observation and painstaking

thought of the original author. All must join in the fond hope that he may long remain with us in health and strength to complete what he has so ably begun. It is a work that must remain a credit, not only to Botany, but to American science forever.—W. W. Bailey.

Distinction between Monocotyledons and Dicotyledons.—Flahault has shown a beautiful distinction between Monocotyledons and Dicotyledons that any botanist with a moderately good glass can demonstrate for himself. A thin longitudinal section through the young root tip shows that in monocotyledons the root cap seems to be an independent thing, fitting on like a calyptra, while in dicotyledons there is no such distinction, but a perfect blending of tissues. In the former case the root-cap is renewed from its own inner row of meristem, while in the latter it is renewed directly from the *punctum vegetationis*.—J. M. C.

Notice.—I would give notice that my address after September 1st will be changed from Hanover to Wabash College, Crawfordsville, Ind. Hence any communications to me of any kind in regard to the Gazette should be addressed to that place after the date mentioned above.—John M. Coulter.

An Interesting Demonstration.—Many plants contain raphides, crystals of oxalate of lime, etc., but cystoliths are of rarer occurrence, although abundant in certain plants, notably in those belonging to the Urticaceæ. A very interesting experiment and one that almost any one possessing a microscope of even ordinary power, say 200 or 300 diameters, may perform for himself is as follows: Take a leaf of *Ficus Indica*, *elastica* or *Morus*, *Morus rubra* or almost any of the Artocarpeæ and make a section of moderate thinness. If too thin the cystoliths will be broken and pulled out by the razor. Under the glass will be seen a beautiful arrangement. Certain cells of the epidermis or of the surrounding tissue are enlarged and specialized and from their top the mass usually hangs upon a short stalk. In *Ficus elastica* the cystoliths consist of an amorphous mass of cellulose studded with crystalline points of carbonate of lime, the whole being in somewhat the form of a very thick bunch of grapes. If now we place a drop or two of acetic acid at the edge of the cover-glass and allow it to creep under while we keep our eye upon the object the result will easily prove the composition of the crystals. Quite a furious effervescence takes place and soon nothing is left but the amorphous cellulose. Upon jarring the table slightly this will be

seen to shake and tremble like a bowl of gelatine jelly. This little experiment is easily tried and may be new to some.—C. R. B.

Reports upon the Botanical Collections Made in Portions of Nevada, Utah, California, Colorado, New Mexico and Arizona, during the years 1871-75. By J. T. Rothrock.—This forms the sixth volume of the Final Reports of the Wheeler Survey and is a work of over 400 pages, containing 30 plates drawn by Isaac Sprague and W. H. Seaman. There are four chapters and an Appendix. Chapter first contains some general notes on Colorado, such as the flora of the open ground, the flora of the mountains, timber and agricultural resources. Chapter second contains notes of the same general nature upon New Mexico, including also some of Arizona. Chapter third contains notes on the Economic Botany of the region included in the report. In this about 35 species are enumerated as being either already in use or worthy of use. Chapter fourth, containing the bulk of the volume, is devoted to the catalogue. In this we have work credited to ten botanists besides Dr. Rothrock himself. To Sereno Watson were entrusted the *Leguminosæ*; to Dr. Englemann the *Cacteæ*, *Asclepiadaceæ*, *Gentianeæ*, *Cuscuteæ*, *Euphorbiaceæ*, *Cupulifera*, *Loranthaceæ*, *Coniferæ*, *Amaryllideæ* and *Junceæ*; to Prof. Porter, the *Polemoniaceæ*, *Borragineæ*, *Scrophulariaceæ*, *Labiatæ* and *Polygonaceæ*; to M. S. Bebb, the *Salicaceæ*; to Wm. Boott, the genus *Carex*; to Dr. Vasey, the *Gramineæ*; to Prof. Eaton, the *Filices* and *Ophioglossaceæ*; to Thos. P. James, the *Musci*; to Prof. Tuckerman, the *Lichenes*; and to C. F. Austin, the *Hepaticæ*. Credit to whom credit is due is a maxim that has been closely followed in this volume and we are never at a loss to know just whose work we are examining. It is a pity that the scope of the volume had not been extended enough to include all the collections ever made in the region embraced in the report. It would then have been complete as far as it went, and filled another gap in our scattered flora. The Ferns are more elaborately reported upon than any other order, for we have a full report not only of those collected by the Wheeler Surveys, but of all Ferns hitherto discovered in the regions lying west of 105 degrees west longitude and south of 40 degrees north latitude. As many of these ferns are described in works inaccessible to the ordinary botanist, descriptions are given of all not found in Gray's Manual. All this is a very grand thing in itself and botanists will rejoice in having so complete a work upon the ferns of that curious and immense region, but it strikes one as being out of proportion with the rest of the work.

A little inconsistency or uncertainty is also to be noticed in the matter of the nomenclature of orders. We have *Polemoniaceæ* and *Gentianeæ*, *Rutaceæ* and *Cacteæ*, *Scrophulariaceæ* and *Scrophularineæ*, etc. In the existing confusion in such names we should have some standard and a work from the hands of such eminent botanists should be consistent with itself. This is not meant as a censorious criticism upon a work meriting so much praise, but as a plea for botanists who, like the writer, are often bewildered in this maze of terminations.—J. M. C.

Revision of the North American Liliaceæ, by Sereno Watson.—Botanists will be delighted at the appearance of this paper, for if any branch of phænogamic botany needs revision it is the Monocotyledons. We have so many works starting out with noble promise, but stopping before the end is reached and hence the Monocotyledons have been neglected. The work now done helps to fill this gap, and botanists should be congratulated that it has fallen into such competent hands. The order *Liliaceæ*, as now accepted, presents such a diversity of characters that it is very difficult to group the genera according to their affinities. The genera have here been grouped in a manner that is entirely new, and, with a few exceptions, it works like a charm. Baccate fruit as distinguished from capsular is considered a subordinate character, and a division into three suborders or series has been made, based upon other characters. The first series is distinguished by "scarious floral bracts, persistent nerved perianth, perigynous stamens with introrse anthers, an undivided persistent style, and a loculicidal fruit (if capsular.) Both of the other divisions have the stamens hypogynous or nearly so, with more or less extrorse anthers, and the floral bracts are more or less foliaceous or are wanting. Both also always have distinct perianth—segments and unjointed pedicels. But one has a nerveless deciduous perianth, the styles (when present) more or less united, and the fruit a loculicidal capsule or berry. The other division has distinct styles and a septicidal capsule conjoined with a persistent nerved perianth." The subdivision into tribes is based on the characters of the inflorescence mainly. The first series contains 9 tribes and 25 genera; the second, 3 tribes and 13 genera; the third, 4 tribes and 12 genera; making in all 16 tribes and 50 genera. In glancing through the paper we made the following notes: *Allium* is the largest genus, containing 46 species, 18 of which are new. For *Hesperoscordium* (?) *maritimum* of Torrey is made a new genus, *Muilla* by name. Wood's *Brevoortia* is

restored and the species becomes *B. coccinea*. *Hesperanthes* is raised from a subgenus of the African *Anthericum* to generic rank and contains one species, *H. Torreyi*. *Hastingsia* is the name of a new genus, separated from *Schœnolirion* to include *S. album*, Durand. *Polygonatum latifolium* is ruled out as not being found in this country. In *Smilacina*, *Maianthium* has been raised to generic rank and *S. bifolia*, var. *Canadensis* becomes *M. Canadensis*. The representatives of the genus *Beaucarnea* and many of the genus *Dasylirion* are included under *Nolina*. *Lilium Grayi* is added to our flora from the Peaks of Otter. The genus *Calochortus* stands second in the number of its species, containing 32. A new genus, called *Oakesia*, is made to contain *Uvularia sessilifolia* and *U. puberula*. *U. flava*, Smith, cannot be distinguished from *U. grandiflora*, and hence is dropped from the specific rank. The varieties *album* and *declinatum* of *Trillium erectum* are also dropped and all included under the description of *Trillium erectum*.

The entire order of *Liliaceæ*, throughout the world, contains 180 genera and 1900 species; 50 genera with 235 species are found in the United States and northward. Mexico adds 4 genera and 40 species, and South America, 26 genera and 58 species. Hence in all America we have 80 genera and 333 species. *Allium*, the largest and most widely distributed genus, contains 270 species.

Experiments on the Nutrition of Drosera rotundifolia.—In the Journal of the Linnean Society for July, Francis Darwin publishes a paper under the above title. The experiments are given in detail and were of the same careful and laborious nature as those of his father. He sums up in a few words the conclusions that would seem to follow: "It would seem that the great advantage accruing to carnivorous plants from a supply of nitrogenous food to the leaves is the power of producing a vastly superior yield of seeds. This will no doubt partly explain the fact which has been a stumbling-block to many, that insectivorous plants seem to thrive without animal food; although, as I have shown, the fed plants are in reality and markedly superior in general appearance. I venture to think that the above experiments prove beyond question that the supply of meat to *Drosera* is of signal advantage to the plants. There can be no doubt that both *Drosera* and other insectivorous plants profit in an analogous manner from the capture of insects in a state of nature.

Cypripedium with a second labellum.—A short time since a specimen of *Cypripedium barbatum* was brought into the Laboratory of the

Botanic Gardens at Cambridge, which proved quite curious in its way. In addition to the regular labellum a second one had begun to be formed from the lower left-hand sepal. Exactly half of the slipper was formed and that was the half next the proper labellum. Everything on that side was perfect, even to the polished inflected edge and purple color, while the other half was as though no change had taken place, having an entire edge and the usual white and purple stripes. —J. M. C.

Parallel Chorisis in the Petals of Campanula media, L.—Mr. W. W. Bailey called my attention recently to a specimen of *Campanula media*, grown in the Harvard Botanic Gardens, in which there were two perfect corolla tubes. The tubes were entirely distinct to their very insertion and no difference could be noticed in their appearance, one being just as typical as the other. That this was a case of parallel chorisis rather than doubling was apparent from the fact that all the other whorls were perfectly normal. Such result might be produced by an abnormal growth of the androecium, which is really corolla-like at its insertion, but the stamens were unchanged.—J. M. C.

A 4-merous Lilium Philadelphicum.—A specimen of this species has just been pressed in the Harvard Herbarium which has 4 sepals, 4 petals, 8 stamens and 4 carpels. Such monstrosities, overleaping the arbitrary barriers of Systematists, are useful to show that nature does not run bounding walls and insurmountable barriers even between her types.—J. M. C.

Two-parted Cotyledons in Eschscholtzia.—In examining the development of the embryo in a garden setting of *Eschscholtzia Californica*, I found in every seed examined, ten in number, that the cotyledons were completely parted, so much so in some cases as to give the appearance of four cotyledons. Thinking that this might be a generic character other species were examined, *E. minutiflora*, Watson, and some of the so-called varieties of *E. Californica*, but either the seeds were too immature or this character does not hold good, for in those which were maturing embryos no trace of the parting could be found. We are led then to the conclusion that this form was merely a sport, and there is no reason why a leaf should not be parted.—J. M. C.

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STAINING AND DOUBLE STAINING OF VEGETABLE TISSUES.—The increased attention given to vegetable histology, which is largely due to the cheapness of good microscopes, makes this a proper time to call attention to the recent improved modes of permanently mounting objects for study. Besides this the clinical microscopes now in use enable a lecturer to pass to his class the objects upon which he may be discoursing, with the different forms of tissue either in contrasting color or in different shades of the same color.

It is simply historic justice to say that thus far Americans have been most successful in the preparation of these stained objects, and to none is more credit due than to Dr. J. G. Hunt, of Philadelphia, and to the late Dr. Geo. D. Beatty, of Baltimore.

For convenience sake, we may divide the objects to be mounted into those which should first be bleached, and those which do not require such treatment.

Taking up the first class we may say it is such objects as are thicker than ordinary, or are of denser texture. Prominent among them we may name leaves and fronds, *when they are not cut in thin sections*, but are intended to be looked at through from surface to surface. *As a rule* such objects are better if they do not exceed half an inch in size; though one may succeed in bleaching much larger specimens, but it requires so long an immersion in the bleaching fluid that the texture of the plant is apt to be largely disintegrated, and consequently altered from its normal condition. I have now before me a specimen of the frond of *Asplenium Filix-fœmina*, R. Br., fully 2 inches long and one-third as wide, in which the frond texture (save the chlorophyll) is almost unaltered; the indusium, sporangium and spores all perfect and most beautifully stained. In such specimens bleaching is absolutely requisite. There are others in which it is simply a convenience, as for example in matured wood sections, where the processes of growth are

ended and we no longer require the starch, protoplasm and chlorophyll. Here the bleaching removes these substances and leaves us the mere skeleton of parenchyma, fibers, ducts and the like, all cleared out and in better condition for clearer observation and hence better adapted to the use of a class.

I should here add that few, if any, fungi or lichens should be bleached; indeed they will almost certainly be injured or destroyed by it.

Bleaching fluid:—The best is Labarraque's solution. The object is to be immersed in it and covered, for the double purpose of excluding dirt and preventing the deterioration of the fluid by exposure to the air. How long it should be kept there depends on circumstances. The best rule is to stay until it is bleached, *but no longer*.

When it is bleached the object should be removed and placed in water, then in another water, then in water slightly acidulated with nitric acid, then into water and alcohol, half and half; after which it may be removed and placed in nearly pure alcohol where it is to remain until thoroughly translucent. If the object is of firm texture and not likely to be injured by the water, a day or two may be spent in the process of washing out all the Labarraque's solution before it is finally assigned to the alcohol. If on the other hand (as in ferns where we desire to retain the sporangia and spores) it be more flimsy, the process must be hastened and should not take more than a couple of hours.

Unbleached Specimens. These are *as a rule* cross or longitudinal sections, and in a general way we may say the thinner they are the better. It once was the custom to bleach these and under certain circumstances we may still do so. It will, however, remove the protoplasm, etc., and thus prevent any successful study of the action of the cell contents as related to growth and to cell-multiplication. I seldom bleach these now. Immediately that the section is made, I place it in a weak mixture of alcohol and water, then gradually increase the strength by adding alcohol. It is, however, to be observed that in the object as cut and before being placed in the alcohol we will find the protoplasm more or less diffused through the cell cavity, tending, however, to gather along the cell walls. The nucleus may be in the center or on one side. When, however, it has been soaked in alcohol, the protoplasm will be observed gathered into a more or less dense mass in the center and the nucleus will then resemble a nucleolus. This must be remembered in studying specimens which have been placed in alcohol. I do not regard any of the means advised to prevent this contraction of the protoplasm around the nucleus as entirely satisfactory.

The section is to be left in alcohol until it has become as clear as it can be made. How long this will be depends entirely on the character

of the specimen and on the quantity of chlorophyll to be removed. As between the bleached and unbleached specimens, necessity may compel the bleaching, but never bleach when you can avoid it and still make a good specimen.

From this point the treatment of the bleached and unbleached specimens is the same, and the only question is as to the staining fluid: what one, or whether more than one. I give this as a general rule: if you are to use but one, let that one be the *Hæmatoxylin Dye*. My reasons are first, it is permanent: second, it is clear and beautiful; third, you can produce with it almost any shade from a deep, almost black-brown, to the slightest tinge of red; fourth, if by accident you obtain too deep a shade you may more satisfactorily remove part of it than of any other dye. This is done by placing the object in, say a tablespoonful of alcohol, and to this add a few drops of bichloride of tin. In a few minutes (often in a few seconds) the alcohol will be colored by the dye extracted and the object be by so much the lighter colored. It is best, however, not to allow the specimen to remain in too long, or it assumes a dead hue instead of the vivid color which it first assumed when immersed.

I give the formula I find in Dr. Beatty's article, republished from Science Gossip into the American Journal of Microscopy, June, 1876, and here would also state how much I am indebted to the article, both for my own methods of staining and for the facts of this contribution.

Take "Ground Campeachy Wood,..... .....½ ounce.
Pulv. Alum,.....1 ounce.

Mix and triturate in a mortar for twenty minutes, then add five ounces of hot, distilled water and let it stand for two days. Filter, and to each ounce of the dye add two drachms of 75 per cent. alcohol. In twenty four hours again filter to remove the precipitated alum."

I would add that all the dyes can be obtained from any respectable optician in our large cities and that it is cheaper to buy than to make them.

In using this, I take the requisite quantity of water to immerse the specimen and add to it just enough of the dye to give the shade I desire, then if but little of the dye was used I add a very little (say 4 per cent.) of powdered alum to the water. *This is not always or even usually necessary.* Then after mixing, for a moment, the dye and the water I immerse the object in it. How long shall it stay there? Until it has done its work. Sometimes, as in some sections, this will be in a few minutes; in other cases it may be hours. Bear in mind, however, that the specimen is to be watched, lest owing to an affinity of certain portions of the plant

structure for the dyes they attract enough(even in a weak solution) to make them black and opaque. Ordinarily the logwood dye is used alone, but there are cases, as in the fruiting fronds of ferns, where we may remove the specimen from the logwood and wash it hastily in a couple of waters to remove any alum crystals which may have formed on it, and then place it in pure alcohol(or nearly pure) which is just fairly tinged with iodine green(aniline), where it may remain for twenty-four hours or more and come out with the frond scarlet, the sporangium brown or brownish-black and the spores bright grass-green. An object fit for ecstasy if one have a binocular microscope! If he do not have, we can only pity him.

It sometimes happens that plants which have a glaucous color do not bleach out so well as to stain evenly in logwood dye. I have found that a prolonged soaking in alcohol would usually remove the trouble.

Now as for the more usual double staining. Here one may have a choice of colors. I will for present purposes give only two; as the principles involved in the use of these would guide in the use of the others; and I will give those which in my own work have given me the greatest satisfaction.

Ammonia Carmine made after the formula of Dr. J. J. Woodward is:

"Pulv. Carmine,.....7½ grains.
Water of Ammonia,.....20 drops.
Absolute Alcohol,.....½ ounce.
Glycerine,.....1 ounce
Distilled Water,.....1 ounce.

Put the pulverized carmine in a test tube and add the ammonia. Boil slowly for a few seconds and set aside, *uncorked,* for a day, to get rid of excess of ammonia. Add the mixed water and glycerine and next the alcohol; then filter."

The other dye I would indicate as the iodine-green. Of this I keep a strong alcoholic solution on my table. Let it be a dark green in strength and it can be weakened to suit the purposes in each case.

Now for the method of using it. Taking the specimen, bleached or unbleached, from the alcohol where it has been "clearing up," I put it in fresh alcohol and to this add enough of the iodine-green solution to give a faint green tinge. Two or three drops in a tablespoonful will suffice ordinarily. This I set away for 12 to 24 hours as the case may be. Examining it after this lapse of time I find the alcohol has appreciably cleaned up. That is, portions of the plant structure have taken it from the solution. Moreover, and very

important, only certain portions (say the bast) will have appropriated it, leaving the other from or almost free from any stain, white as when it left the Labarraque, almost. This then is an important point: the other anatomical elements are free to take another color without a dauby tinge which suggests bad workmanship.

I never am in a hurry to get it out of the iodine-green. Let it have time, and if required, add a few drops more of the dye. When, however, it is ready, I place down small porcelain saucers, or watch crystals, in the following order: to begin on my left hand, 1 water, 2 ammonia carmine, 3 alcohol, 4 alcohol, 5 alcohol, 6 *alcohol pure*, 7 oil of cloves. Then I take the specimen from the iodine-green, dip it a moment in water, then about 20 seconds to a minute in the carmine, then through the alcohols, in each of which it remains 10 to 20 minutes, except in the first where it remains only long enough to have the unfixed carmine washed away.

From the last alcohol (which should be if possible absolute) it goes into oil of cloves where it should remain long enough to become perfectly transparent. Five minutes may suffice for this, or it may require hours.

From oil of cloves I mount it permanently in *balsam*. If however, any water remains in the specimen it will be found that it will cloud when it is placed in the balsam. Hence, as you value a nice, clear specimen, give it time in alcohol and in oil of cloves.

There are other ways than the one I have given to stain and double stain. But knowing the one, others will readily enough suggest themselves. Other colors too may be used, but these will do to start with. Particular objects may require particular dyes.

Thus on the same slide, I have 3 sections of *Peziza floccosa*. One is unstained and so transparent that it requires nice manipulation (in the balsam mount) to bring out either asci or spores. The next is stained with the hæmatoxylin dye and shows the hyphæ and the root-like hairs beautifully, but the asci and spores only tolerably. The third section is stained with a solution of iodine-green. This developes the spores and asci strikingly and leaves the hyphæ proper uncolored.

Of course this illustration only points a general principle. I would, however, add that so far as my somewhat limited experience in making sections of fungi goes, I have found nothing which is more satisfactory for bringing out the spores than this iodine-green.

It may be well to say in conclusion that even the advanced investigator will will find these stained slides of great service to him, as the dyes act so unerringly that often a stray cell or clump of cells of a different morphological

character from the surrounding ones will be indicated at once. To the instructor they are essential service, enabling him to say to his class:—the red is this and the green that, and so leaves no possible ground for misunderstanding.

J. T. ROTHROCK.

EPIPACTIS HELLEBORINE, var. VIRIDENS (*E. viridiflora*, Reichenbach) a North American plant.—The Ladies' Botanical Club, of Syracuse, N. Y., has recently made a most interesting discovery, which I am desired to announce in the BOTANICAL GAZETTE. In a pine wood near Syracuse, early in August, one of the members of that spirited society, Mrs. Church, found this European *Epipactis*, growing along with *Pogonia pendula* and *Corallorhiza multiflora*. Two specimens only were collected, one of which was sent to me by Mrs. Rust, the president of the club; and on a second visit, the members of the club found three or four more specimens. The plant appears to be exactly the *E. viridiflora* of Reichenbach, well figured in the Iconographia Floræ Germanicæ, which, peculiar as it seems to be, is reduced by Irmisch to a variety of *E. Helleborine*. The type is not wholly new to North America, for *E. gigantea* is a California species, which also inhabits Texas. Orchids are the least introducible of plants, and I should have no doubt that this is truly indigenous in this only known American station. It is to be noted that it is found in the district which is almost alone in possessing *Scolopendrium* (the indigenous character of which is confirmed by several localities, all in completely wild stations) also *Botrychium Lunaria*, a third European species of rare occurence in this country.—A. GRAY.

THE SYRACUSE BOTANICAL CLUB.—Following the finding of *Epipactis Helleborine* it may be of interest to the readers of the GAZETTE to know something about the rise and progress of this energetic club composed entirely of ladies. The idea of a club seemed first to find its origin in a class organized for the purpose of studying Botany. This class was formed only last January and out of that start has grown a club that is doing good work and bids fair to verify the saying "by their fruits (and flowers) ye shall know them." The club was first called the Rust Botanical Club, but at the request of Mrs. Rust herself it was changed to the present name. The club meets weekly for work and study and monthly to transact business. The first study undertaken was that of their native ferns, a collection having been made by their Secretary, Mrs. F. J. Myers. They report having thoroughly worked up the 40 species found in Onondaga County, and have published a list of the same. Then the spring found them ready

for active work in the field, and appointing an executive committee to perfect all arrangements, they determined upon weekly excursions near and far, with the hope of soon collecting the flora of the county. These weekly excursions have been faithfully kept up, every Saturday, when the weather permitted, finding them somewhere in search of plants. At the present writing they have made 18 such excursions and have discovered not only new stations for rare species, but a genus new to our Atlantic border. They seem to abound especially in Orchideous plants and we may hope for much good work yet to be done. They state their objects to be mutual instruction in the science of Botany, and to induce women, particularly, to occupy themselves in a way both improving and pleasant. They have now gone so far as to have a regular constitution and by-laws and are electing honorary and corresponding members. They would invite correspondence with botanists or other clubs upon subjects of mutual interest. Their officers are Mrs S. M. Rust, President; Mrs. Chas. Barnes, Vice-President; Mrs. F. J. Myers, Secretary; and Mrs. Annie Fairbanks, Treasurer.

A 5-MEROUS LILY.—Seeing a note in the GAZETTE about 4-merous *Lilium Philadelphicum* reminds me of the 5-merous one I found last week in Litchfield county, Conn. It had 5 sepals, 5 petals, 10 stamens and a 5-parted pistil. I secured the bulb but I doubt if it does the like again. It was a fine specimen.—E. S. MILLER.

DUPLICATE COROLLA OF CAMPANULA.—In the case of a double corolla of a garden *Campanula*, mentioned in the GAZETTE, p. 200, were the lobes of the two corollas opposed to or alternate with each other? If the latter (which is the common case) why is it said to be a case of chorisis? Then what is *Campanula media*, L? We never heard or read of such a Linnæan species. Probably *Campanula Medium*, L. was meant. This the old herbalists called *Medium*, and so Linnæus adopted this name for the species, not as an adjective, but as a proper name.—A. GRAY.

WHITE BERRIED MITCHELLA REPENS.—Dr. Gray will find an account of the discovery of a white Partridge Berry in the *Proceedings of* the *Academy of Natural Sciences of Philadelphia*, for 1878, page 383, with some further observations on its strictly dicœcious character. It appears by that note that the plant was full of white berries when found three years before, but failed to produce berries under culture through removal from its perfectly polleniferous neighbors.—*

VERATRUM WOODII AGAIN.—I have discovered another locality for this rare plant, being the rocky banks of Long Creek, ("Stony Hollow"), in Desbroines Co., Iowa, about 8 miles north of Burlington. I have but one specimen and a close search did not reveal any other.—

H. N. PATTERSON.

SCUTIA FERREA, Brongn., more properly named *Condalia ferrea* by Grisebach, was collected in Florida, perhaps for the first time, by Dr. A. P. Garber, in May and July, 1877, in flower, and later sparingly in fruit. The plant which has passed for this in Chapman's Flora and in several collections, which was collected on Key West long ago by Blodgett and recently by Dr. Palmer, also by Dr. Garber at Miami, etc., is

REYNOSIA LATIFOLIA, Griseb. Cat. Cub. 33, a peculiar genus, characterized by a very thin-shelled baccate drupe, filled by a large seed with ruminated albumen. As this plant inhabits the Bahamas and Danish Islands as well as Cuba and Florida, it is probable that it has some earlier names. Without much doubt it is *Rhamnus lævigatus* of Vahl's Symbolæ (*Ceanothus lævigatus*. DC.), from St. Croix, West. Yet Baron Eggers, in his Flora of St. Croix and the Virgin Islands, and in his paper on the genus *Reynosia*, does not adduce this synonym, nor indeed does he otherwise dispose of it. This genus is an interesting addition to our flora, which we have had in hand for a long time without knowing it.—A. GRAY.

AGARICUS MORGANI, Peck. I am this season finding elegant specimens of this remarkable Agaric, which was described in the March number of the BOTANICAL GAZETTE. One plant measures 11 inches across the pileus and is 8½ inches high; the bulbous base of the stipe is 2 inches in diameter tapering upward to one inch; the heavy movable ring is situated above the middle of the stipe. It is a much heavier and stouter plant than *A. procerus*, Scop., though not as tall. It is stouter than any of the *Amanitas* and with a much greater expanse of pileus. It reminds me somewhat of *A. maximus*, Fr., though with a much longer stipe and a more regular pileus. I am disposed to claim that it is the largest Agaric in the world. The remarkable thing about the plant, however, and the feature by which it differs from all other *Agarics* and by which it is readily recognized is its

green spores. When first caught on white paper, the spores of mature specimens are a beautiful bright green; they soon change, however, to a dull green. I observe this year the spores of immature specimens to be greenish-yellow with scarcely a preceptible tinge of green. I find this Agaric during the last of August and first week or two of September after continued rains: it grows in open grassy places on rich soil. I would like to ascertain its distribution and would be pleased to receive notes from botanists who may meet with it. I should think it might be found in Kentucky and Indiana.—A. P. MORGAN, *Dayton, O.*

SEEDS OF ERODIUM CICUTARIUM.—I have thought that a few facts in regard to *Erodium cicutarium*, the Alfillerilla or Pinweed of California would be of interest to the readers of the GAZETTE. It is a great pasture plant in California and is very common all over the State. Cattle and horses eat it with avidity, and there is so much nutriment in it that even when dried on the ground so as to form a naturally cured hay, they get fat on it. It is to the seeds, however, that I wish to call attention. They are five in number, each with a long hairy awn, all of them united to an upright stylus. The seeds are hard and have sharp points, sticking with great tenacity into every thing they touch. If, when nearly ripe, the seeds are taken and separated from each other and laid upon the hand, or any other place for that matter, the awns will begin to twist. As the drying goes on, the coil gets tighter and tighter until a close coil for about half the length of the awn is formed. The untwisted end sticks out at right angles. Thus the seeds lie during all the long dry summer, ready when the first rains of autumn come to sprout and take root. When they are wet by the rain, the coiled up awn begins to untwist, and it would appear as if the sharp point of the seed would be forced in the ground by this action. Such I am not positive is the case, but reasoning from analogy it might be said so. We know that the awns of several species of grasses have this habit of twisting and that they are forced into the ground, and the inference is just that the same result takes place with *Erodium*. When we consider the number of seeds produced by each plant, and the provision Nature has made for its dissemination and preservation, it is no wonder that it is so common all over the State.—J. F. JAMES, *Los Angeles, Cal.*

TILLANDSIAS UNDER CULTIVATION.—During my trip to Florida last winter I collected a large number of these curious air plants. Arriving home about March first, I put them in my green-house where they have done well, and

several of *T. bracteata* have thrown up long spikes and blossomed—though much later than in their native clime. From the lot I selected a cluster of *T. cæspitosa*, Leconte, for my dry herbarium, thinking that it would dry out. But I noticed after some time that the plant seemed green, so I tied its roots upward to a rafter, where it was deprived entirely of moisture. And now after nearly six months it has assumed a thoroughly live appearance and increased in growth amazingly. By spring it will no doubt blossom. The long moss, *T. usneoides*, of which I hung quantities on my cherry trees in the yard, has grown very fast all summer and I dread the approach of frost, when it must succumb to the rigors of our northern climate.—W. W. Calkins

Nomenclature in Atlantic U. S. Polypetalæ.—The article in the Gazette for August, p. 193, noting changes in the names of the Polypetalæ of the Manual, as indicated in Watson's Bibliographical Index, brings to view an error in that carefully prepared index, either clerical or typographical, which has till now escaped detection. The Gazette notes "*Cardamine rhomboidea*, var. *purpurea*, Torr., is *C. rotundifolia*, Mx." Those who know the two plants will not need to be told that this is wrong. The three synonyms adduced under *C. rotundifolia* in the Index must have been accidentally inserted under that species, instead of under *C. rhomboidea*.

There are a few other names in the list in respect to which the Index hardly gives the last word. Although the question is a nice one, the author of the Index would on reconsideration, probably prefer *Spergularia* to *Lepigonum*; the change of *Sullivantia Ohionis* into *S. Ohioensis* was accidental; *Dalibarda repens* (*pace* Benth. & Hook.) will probably stand as the type of a good genus; and whoever uses the Linnæan name of *Vitis arborea* for a species which is not arborescent is not entitled to forego *Epilobium angustifolium*, L., (well enough named in contradistinction to its relative *E. latifolium*, L.,) in behalf of the much later *E. spicatum* of Lamarck. Apparently the same rule should govern the two cases.—A. Gray.

Flora of Dallas County, Texas.—It has been my bad or good fortune to live in this little corner of the world for twenty years, but it is only for ten years that I have given earnest attention to botanical pursuits. During that time I have collected carefully all the plants I have found in the country. Very few I think can have escaped my constant search, so that the following figures may be considered correct. There are 839 indigenous species, to which must be added 66 introduced species that have taken such a foothold that they may be considered indigenous, making a

total of 905 species and good varieties. These are distributed through 105 orders and 455 genera. The largest order is that of the *Gramineæ* being represented by 125 species. The next largest orders are the *Compositæ* with 121 species and the *Leguminosæ* with 81 species. The *Orchidaceæ* have but 3 species and the Ferns number 7 representing as many genera. The *Ericaceæ* have not a single representative. Three new species have been discovered in this county, viz: *Dalea Hallii*, Gr., *Vicia Reverchoni*, Watson, and *Scutellaria brevifolia*, Gr., to which I hope to add two more, a *Cuscuta* and a *Silphium*.

With the advance of civilization several species have been nearly exterminated and to my knowledge three, at least, have enterely disappeared.—JULIEN REVERCHON, *Dallas, Dallas Co., Texas.*

POISONING BY RHUS TOXICODENDRON.—As botanists are very apt to meet with cases of poisoning by the so-called poison ivy or poison oak, it is just as well for them to know a cure that is simple and effectual. In the *Medical Record* of July 12 is a note from Dr. Wm. E. Brandt, of Hanover, Ind., in which he claims to have found such a remedy. He states that the treatment for this trouble has been rational only since the discovery that the poisoning agent was an acid. Very naturally, then, alkaline substances should be used to neutralize the poison, and Dr. Brandt has found that the hyposulphite of soda, is probably the best. He uses a saturated solution, keeping the affected skin moist, and in severe cases giving it internally at the same time. He has thus succeeded in checking the worst cases in from 24 to 48 hours.

CONTRIBUTIONS TO AMERICAN BOTANY, IX, by Sereno Watson.—In the last GAZETTE we noticed the first part of this contribution, being a revision of North American *Liliaceæ*. The second part is devoted to the description of about 50 new species, chiefly from the far west. The *Ranunculus alismæfolius* of the Manual becomes a new species, and as it has been knocking about for some time it is called *R. ambigens*. Three new Crucifers are described, a *Dentaria*, a *Draba* and a *Thelypodium*. Two Silenes are reported and both do honor to the Botanic Garden, one being *S. Grayii* and the other *S. Sargentii*. Two Psoraleas are described, and one has so nearly the oder of a skunk that it is called *P. mephitica*. *Vicia* also gains two species, one from Texas and the other from Florida. One of the most interesting things in the list, though, is the description of a new *Sullivantia*, bearing the name *S. Oregana*. It looks very much like *S. Ohionis*, and we are very strongly of the impression that the latter is also

stoloniferous. The new *Sullivantia*, like the old, grows on wet rocky banks. Three new Polygonums are described, and of course *Eriogonum* must receive some accessions; in this case there are five. A new genus of *Eriogoneæ* is described under the name of *Hollisteria*, and as yet it is represented by the single species, *H. lanata*. Three new species of *Ephedra* are described and all the North American species are defined, numbering five. They are *E. antisyphilitica*, C. A. Meyer, *E. Nevadensis*, Watson, *E. trifurca*, Torr., *E. Torreyana*, Watson, and *E. Californica*, Watson. A new *Cupressus* is described from Guadalupe Island. It was distributed as *C. macrocarpa* in Dr. E. Palmer's collection, but now bears the name of the Island. The plant distributed in the collections of A. H. Curtiss as *Amaryllis Atamasco* is named *Zephyranthes Treatiæ*. *Luzula* and *Juncus* are each represented by two new species.

Willows of California, by M. S. Bebb.—These are advance pages from the "Botany of California," Vol. II. That Mr. Bebb is the American authority on Willows every botanists knows, and hence when a contribution to American Botany like the present is made it becomes of great importance. This is all the more interesting as the genus *Salix* is a very difficult one and consequently about the last approached by the average botanist. It seems that there are in the world about 160 species of *Salix*, of which number 60 are North American, 19 being found in California. Mr. Bebb describes 6 new species and 13 new varieties. The species are named in honor of the State and the workers there. They are *S. Lemmoni*, named in honor of one whose name bids fair to become attached to every other genus in his state; *S. Austinæ* in honor of a lady whose untiring zeal is neatly complimented in this connection; *S. Breweri*, a very interesting discovery of a genuine American representative of the *Viminales*; *S. Californica*; *S. Monica*, named for the Mono Pass, and belonging to the *Myrtosalix* section, and *S. laevigata*. When Mr. Bebb gives us his final revision of North American Willows we will be satisfied, and not till then.

BOTANICAL GAZETTE.

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THE BEHEADING OF FLIES BY MENTZELIA ORNATA.—In the *Bulletin de la Societe Botanique de France*, vol. xxiv, 1877, p. 26-30, is an account, by M. J. Poisson, of his observations upon *Mentzelia* (*Bartonia*) *ornata*, as cultivated in the Jardin des Plantes, Paris, and the very singular mode in which it causes the destruction of flies. This account, until now, had escaped my notice. It is so curious that I here recapitulate the essential points of M. Poisson's communication, in the hope that observations may be made in this country, either by the few who are able to cultivate this ornamental plant with success, or by those who can examine it in its native stations. It is well known that the roughness of this and some related *Loasaceæ* is owing to the stiff bristles of the surface being provided with an armature, at certain points along their length, of retrorse barbs. There are three or four whorls of these barbs, and four or five barbs to each whorl, on the larger bristles; in the smaller there is only a terminal whorl of barbs, in the manner of a glochidiate bristle. Mixed with these harpoon-like bristles are some soft ones, tipped with a capitate gland, which secrete a viscid matter attractive to insects. It appears that flies so attracted thrust in their proboscis between the thickly set glochidiate bristles to feed upon the secretion of the glands between and below. The retrorse barbs interpose no obstacle to this: but when the proboscis is withdrawn, its dilated and cushion-like tip catches in the barbs, and holds all fast. The harder the backward pull, the firmer and the more extensive the attachment to the sharp barbs: the wounded and impaled organ becomes congested and swollen; and the insect is seldom able to disengage it. Especially is this the case with the larger flies. Some perish by exhaustion; but more of them, passing round and round in a circle and in one and the same direction, come to an end by twisting off their heads! Dried specimens of the plant in herbaria exhibit many small coleoptera and the *debris* of various other small insects, but these have been caught by their feet or mandibles or other parts. Insects too small to be impaled on the barbs are held fast by the viscid secretion of the glands, and likewise perish. In these respects the arrangement comes under the head of those recently illustrated by Kerner, for the exclusion from

the blossom of unwelcome guests. And this may be extended to the flies also, which might reach the blossom on the wing, but are attracted rather to the glands beneath, to their own destruction. Those who have good opportunities of observing *Mentzelia ornata*, and its much more common relative *M. nuda*, are requested to investigate the matter, and ascertain whether this charge of cruel behavior is well founded.—A. Gray.

Fission of Leaves in the Peach.—Mr. Henry W. Lothrop, an observant naturalist of Providence, has just brought me some leaves from a common peach tree (*Prunus Persica*), in his garden, which exhibit fission in a curious manner. On the same tree occur normal lanceolate leaves, others broader and barely three-lobed, some which are decidedly three-cleft, and some bifurcated in the manner so common in ferns. The last present a curious modification. What, in the three-cleft form, is the terminal segment, is here, in some cases, reduced to a minute leaflet, standing at right angles to the plane of the leaf.

That the phenomenon results from fission, and not from the fusion of two leaves, is shown by the position of the leaves, and by the continuation of the midrib in the simply lobed forms, to the normally acute apex. In some of the three-cleft ones, a vein rather stronger than the general pinnation runs into the lateral lobes. In the bifurcated examples, the midrib apparently divides at the sinus, giving off a branch to each lobe.—W. W. Bailey.

Supplementary Note.—Since I forwarded an account of this abnormality, Mr. Lothrop, in whose garden the tree grows, has brought me some still more aberrant leaves. These are of the bifurcated type, with the odd leaflet borne in the sinus, but in these the leaflet is, as one might say, proliferous, bearing another beyond, or as if the first were constricted in the middle. The owner attributes the eccentricity of the tree to unusual manuring.—W. W. B.

The dichogamy of Spigelia Marilandica is strongly marked, and is of the type of *Campanula*. The anthers connive around the style, the upper half of which is beset with pollen-collecting hairs, on which the pollen is copiously deposited: the elongation of the style now protrudes the pollen-laden portion, and the terminal stigma matures a day or two later. In the second flowering here in September the adjustment occasionally fails by the style elongating before the anthers discharge their pollen.—A. Gray.

PURSH'S STATION FOR SCOLOPENDRIUM VULGARE RE-DISCOVERED.—That the ladies of the Syracuse Botanical Club are both zealous and fortunate may be shown by the following note from their Secretary, Mrs. M. J. Myers:

"We have to day (Sept. 30) found Pursh's locality for *Scolopendrium vulgare*. Dr. Torrey in his work published in 1843, says: "It was first detected in North America by Pursh, who found it among loose rocks, in shady woods, near Onondaga, on the plantation of J. Geddes, Esq." That gentleman was grandfather to the present owner, Mr. James Geddes. The fern was discovered when his father, Mr. Geo. Geddes, was a lad. He saved a frond and many botanists have since that day searched for the fern, but it was left for us to rediscover it to-day. Some twenty of us visited the farm to-day, and separating into two parties, explored thoroughly. Mrs. Barnes, our Vice-President, was probably the first lady who saw it, but several others were not far behind. The locality is not far from the new station for *Botrychium Lunaria* and *Epipactis*."

THE MOST ARCTIC TIMBER.—Among the specimens brought from Grinnell Land by the British Polar Expedition of 1875-6, from the Alert's winter-quarters, lat. 82 deg. 27 min., is a piece of dead stem of *Salix arctica*, a centimetre and a half in diameter, "on a section of which nearly 40 annual circles" of very different size have been counted. This is said to be "the finest piece of indigenous timber yet met with in Grinnell Land."—A. GRAY.

"CARNIVOROUS PLANTS."—The epithet *carnivorous* seems to have been first applied to plants by Wm. Bartram, in the introduction to his Travels, p. xx. where in a very highly wrought description of *Dionæa muscipula*, he denominates it a "carnivorous vegetable." He suggests the same of *Sarracenia*, but remains in doubt.—A. GRAY.

GLUE FOR THE HERBARIUM.—*Fish glue* is made on a large scale at Gloucester, Mass., and is sold both in a solid form and in a pasty liquid state. It is cheap, nearly colorless, and strong, and well adapted for affixing specimens and tickets to the herbarium-sheets. We here use it in the liquid form, and find it very handy and excellent. It takes the place both of the ordinary glue, in which it saves heating, and of the tragacanth paste.—A. GRAY.

AN EXTEMPORE BOTANIC GARDEN.—I doubt if any college which does not boast a regular botanic garden, can show upon its own

waste-grounds a longer list of plants than Brown University. On the 19th of September, in a rapid inspection of the campus, I recorded 118 species, representing 41 natural orders. As often happens in such localities, there was an odd jumble of garden and wild plants. I have no idea that I exhausted the list, which, it must be remembered also, represents but one season.—W. W. Bailey.

Miscellaneous Notes.—On Monday, October 6th, I found on the college campus *Cornus paniculata*, L'Her, simultaneously in fruit and flower. *Viola pedata* is having a second period of blossoming, and a friend in Vermont writes me that as late as October 1st she gathered Hepaticas in flower.

Mrs. Kilburn, of Lonsdale, R. I., sent me the *Leptopoda brachyptera*, Torr. and Gray, from Lincoln, R. I. I visited the locality and found the plant abundant and spreading. The original owner of the estate, called Quinsnickett, introduced many things in the neighborhood, which are now well established, and perhaps this. Almost at the same time, Mr. J. L. Bennett found *Helenium autumnale*, L., in the same town. It is convenient to have a locality for these plants within easy reach.—W. W. Bailey, *Brown University*.

New Species of Fungi, by Chas. H. Peck.—Agaricus (Collybia) amabilipes.—Pileus thin, convex or expanded, glabrous, reddish-yellow and striatulate on the thin margin when moist, reddish-brown or chestnut-colored when dry; lamellæ broad, not crowded, subventricose, rounded behind, pale-yellow, venoseconnected; stem equal, stuffed or hollow, velvety, tawny-brown; spores elliptical, .0003 of an inch long.

Plant 2–3 inches high, pileus about 1 inch broad, stem 1–2 lines thick.

Decaying wood. Sheboygan, Wisconsin. July. *J. J. Brown.*

This pretty species is related to *A. velutipes*, from which it differs in its more scattered mode of growth, more slender stem, and different spores. Its pileus also is not viscid and shrivels less in drying.

Bovista subterranea.—Subgregarious, immersed in the soil; peridium subglobose, about one inch in diameter, the exterior whitish, covered by dense mycelioid filaments and adhering dirt, at length separable from the smooth flexible interior peridium; capillitium and spores brown, the flocci long, slender, flexuous, simple or sparingly branched, the spores globose, rough, .00025—.0003 of an inch in diameter.

Grassy ground. Dakota Territory. July. *C. W. Irish.*

I have referred this fungus to the genus *Bovista*, although it is a remarkable and somewhat aberrant species. The external peridium is coated with fine whitish mycelioid filaments which permeate the surrounding soil and bind it together so that the plant is enveloped in a coat of dirt which adheres closely to it. When mature this peridium with its adhering dirt may be separated from the inner peridium in large flakes or even almost entire. When the plants are taken from their place of growth the basal part of this peridium remains in the ground unless care is taken to secure the whole plant. The specimens are not quite old enough to show the mode of rupture of the inner peridium. The flocci are more slender and less branched than is usual in species of *Bovista*. There is no mass of cellular tissue at the base of the peridium, the whole cavity being filled with the capillitium and spores, which are of a pale snuff color. Concerning its habit and habitat Mr. Irish writes, that the plants do not grow upon the top of the ground, but are sunk in it, the upper part just reaching the surface. As seen from above they present the appearance of that fungus that resembles bird-lime scattered over the ground. They grow in little communities occupying from three to five square feet and always in thick grass. Their crowns are covered with a closely adhering scale or scales of soil and the lower part of the whitish envelope always parts from the plant on taking it out of its bed.

GYMNOSPORANGIUM SPECIOSUM.—Erumpent in tuberculiform or oblong laterally-compressed masses, orange colored; spores large, elliptical or oblong, uniseptate or biseptate, often strongly constricted at the septum, .002–.003 of an inch long, .0008–.0011 of an inch broad, the pedicel about .0003 of an inch thick.

Bark of *Juniperus occidentalis*. Colorado. *T. S. Brandegee*. Communicated by *E. A. Rau*.

This species retains its bright orange-yellow color in the dry state, a peculiarity by which it is readily distinguished from the other American species, *G. juniperianum*, *G. biseptatum* and *G. clavipes*. The spores in this are also rather larger than in the other species. They are often biseptate but the greater number are uniseptate.

PUCCINIA ABERRANS.—Spots none; sori amphigenous, generally confluent, dark reddish-brown; spores oblong or oblong-clavate, obtuse or obtusely pointed, constricted at the septum, occasionally biseptate, .0016–.0024 of an inch long, .0008–.001 of an inch broad, the pedicel very short or obsolete.

Leaves of *Smelowskia calycina*. Alta, Wasatch Mts., Utah. Altitude 12,000 feet. *M. E. Jones*.

The species is remarkable for frequently producing biseptate spores; in which character it approaches the genus *Phragmidium*. Sometimes two or three of these spores are visible at once in the field of the microscope, so numerous are they.

Puccinia intermixta.—Spots none; sori abundant, scattered, often intermingled with the *Æcidium*, amphigenous, dark reddish-brown; spores oblong-elliptical, obtuse, slightly constricted at the septum, .0014–.0016 of an inch long, .0008–.0009 of an inch broad; pedicel very short or none.

Leaves of *Iva axillaris*. Green River, Wyoming Territory. July. *M. E. Jones*.

Puccinia Physalidis.—Spots none; sori abundant, frequently confluent and occupying the whole lower surface of the leaf, reddish-brown; spores elliptical or oblong-elliptical, often irregular, slightly constricted at the septum, .0012–.0016 of an inch long, .0008–.001 of an inch broad; pedicel hyaline, nearly equal to the spore in length.

Leaves of *Physalis viscosa*. Colorado. June. *M. E. Jones*.

Sorosporium Astragali.–Spore-masses subglobose, compact, .001–.002 of an inch in diameter, purplish-brown, destroying the seeds and filling the pod; spores six to twelve in a mass, minutely rough, closely adhering to each other and somewhat flattened on their contiguous faces, subglobose, .0006–.0008 of an inch in diameter.

In the pods of *Astragalus Drummondii*. Colorado. May. *M. E. Jones*.

The species is closely related to *S. Desmodii*, but its spores are more minutely rough and have a decidedly darker purplish-brown color. It fills the whole pod with its dusty mass, not even leaving the external coat of the seeds.

Trichobasis Oxytropi.—Spots none; sori scattered or crowded, amphigenous, reddish-brown; spores obovate or broadly elliptical, minutely rough, .001 of an inch long, .0007 of an inch broad.

Leaves of *Oxytropis Lamberti*. Colorado. *T. S. Brandegee*. Communicated by *E. A. Rau*.

Trichobasis gaurina.—Sori few, scattered, erumpent, dark-brown; spores subglobose or elliptical, minutely rough, .0008–.001 of an inch long, generally containing a shining nucleus.

Leaves of *Gaura coccinea*. Colorado. June. *M. E. Jones*.

Æcidium gaurinum.—Peridia amphigenous, numerous, scattered or crowded, generally occupying the whole lower surface of the leaf, scattered on the upper surface, short; spores subglobose, bright-yel-

low or orange, 0006–.0008 of an inch in diameter, generally containing one to three shining nuclei.

Leaves of *Gaura coccinea*. Colorado. June. *M. E. Jones.*

This and the preceding one are probably forms of one species which may yet occur as a *Puccinia* or a *Uromyces*.

Notes from Toledo, Ohio.—*Schollera graminea* grows on muddy shores of Maumee Bay less than 2 inches high, leaves about 1 inch long, the seeds maturing near the surface of the mud, the perianth tube varying from ½ to 1 inch long, just barely pushing the flower above the water's surface. Dr. Beardslee, of Painesville, O., found the same form at the termination of the Welland Canal on Lake Ontario.

Solidago rigida, when growing in shaded situations, frequently has leaves with a very soft pubescence. *Liatris spicata* and *L. scariosa* both have a vanilla scent in drying. In the former the fragrant principle is in the flowers mainly, but in the latter the leaves are most fragrant. Dr. Beardslee observes that *L. elegans* is also fragrant.

Amarantus Blitum, growing here, invariably has strongly reflexed branches and especially so late in the season, making a very marked difference in its outline and that of *Amarantus albus*. Both grow abundantly on the Wabash Railroad.

A form of *Zizania aquatica* with purple glumes and stems grows in the Maumee River here with the ordinary form.

Solidago altissima, 1 to 3 feet high is plenty here and is now in full bloom. Mr. G. Butler called attention to this form a year or so ago in the Gazette.

I found *Cornus stolonifera* in full bloom August 25.

Lactuca scariola grows on the banks of the Maumee River apparently without cultivation.—J. A. Sanford.

Notes from Ottawa, Ill.—I have recently found *Petalostemon foliosus* in abundance in this town, and have specimens to exchange, particularly for ferns. Have found *Lycopodium Selago* and *Poterium Canadense* in this vicinity.—H. L. Boltwood.

Unusual growth in Rhus Toxicodendron.—On the side of a steep bank of the Mauvais Terre Creek, Morgan Co., Ill., safe from the unfriendly axe of farmers, there is growing a *Rhus Toxicodendron* which measures 14 inches in circumference two feet from the ground and 11 inches 5 feet higher up. About 12 feet of the lower half of the stem clings to a tree in the usual manner. The remaining 10 or 15

feet stands out free from the tree and branches vigorously at the top, giving to this part of the vine a fine arborescent appearance.—

J. M. Milligan, *Jacksonville, Ill.*

Gentiana linearis.—In a note from Mr. Howard W. Preston, of Providence, R. I., he states that on September 4th he found *Gentiana linearis*, Frœl., growing at Princeton, Mass.

Botanical Contributions by Asa Gray. [Issued October 1, 1879.] —The first part of this contribution contains descriptions of new *Compositæ* in the Mexican collection made by Drs. Parry and Palmer in 1878. About 50 new species are described, the following being the genera with more than two additions, viz.: *Eupatorium* receives 8 new species, *Brickellia* 5, *Baccharis*, *Calea*, *Tridax* and *Perezia* each 3. A new *Gnaphalium* is described, said to be the handsomest one of the *Rhodognaphalium* group, a group peculiar to Mexico. Two new genera are described; one belonging to the *Eupatorineæ* and resembling *Kuhnia* and *Brickellia* in involucre and flowers bears the name of *Barroetea*. It starts with two species, one having been described by Schauer in Linnæa under the name *Bulbostylis subuligera*. The other new genus belongs to the *Helenioideæ*, near *Laphamia* and *Perityle* and is called *Eutretas*.

The second part contains descriptions of some new North American genera and species. *Suksdorfia* is a new genus of the *Saxifrageæ*, belonging to the same group as *Sullivantia* and *Boykinia*. It was found in Washington and Oregon Territories along the Columbia River. The genus *Carpenteria* was described by Dr. Torrey in 1849 from specimens collected by Fremont in California, representing only the fruit and some vestiges of the flower. Now from Dr. Kellogg come good flowers, flower buds and fruit and hence the character can be completed. The genus is very near *Philadelphus*. *Howellia* is a new genus of *Lobeliaceæ* discovered in Oregon. It grows in stagnant water and has two forms, one submersed and the other emersed, differing from each other in flowers and leaves. The submersed plant looks like a narrow leaved *Anacharis*, while the emersed form more resembles *Downingia* in leaves. The genus is dedicated to the Howells, who discovered it in May, 1879.

From better flowering specimens of the *Newberrya* of Torrey a fuller character is given.

A new species of *Ranunculus*, from Colorado, called *R. Macauleyi*, resembles *R. nivalis* so much in flower that it was distributed with it

and only recognized on receiving other specimens with the lower leaves, which are very distinct. *Cardamine Clematitis*, Shuttleworth, was collected by Dr. Gray and party on Roan Mt., during the southern trip of last summer. It was collected before by Rugel in 1844. Dr. Gray had confounded a specimen of it with *C. rotundifolia*, this being the only authority for attributing sometimes to that species trisected leaves, as is done in the Manual for the Northern States. Two new *Astragali* are described, both discovered in Oregon by Jos. Howell. *Elephantopus nudatus* is added to our flora, being found in Delaware. It is the *E. scaber* of Torr. and Gray's Flora. The *Leptoclinium* section of the genus *Liatris* is raised to generic rank. Dr. Garber adds a new *Liatris* from Florida, which bears his name. A new *Rhododendron* from North Carolina bears the name of *R. Vaseyi*. In regard to its relations Dr. Gray says: "The American Azaleas previously known consist of one aberrant species, *R. Rhodora*, and of a well-marked group (to which *R. Ponticum* also belongs) characterized by a long-tubed funnel-formed corolla and long exserted stamens and style. But the East Asiatic species of the same true *Azalea* subgenus have campanulate or rotate-campanulate corollas, and some of them very deciduous *perulæ* to the separate flower-buds. This most interesting new species is one of that group, and it thus adds another to the now very numerous cases of remarkable relationship between the Chino-Japanese and the Alleghanian floras."—J. M. C.

Grevillea for September.—New British Fungi by M. C. Cooke. New Jersey Fungi by M. C. Cooke and J. B. Ellis. A notice of Dr. J. T. Rothrock's final report on the Botany of the Wheeler survey. On *Peniophora* (with plates), a new genus of Hymenocetous Fungi, by M. C. Cooke. Experiment on the Calorific Properties of Lichens by W. Lander Lindsay. New British Lichens by Rev. J. M. Crombie. A notice of a series of microscopical mountings of Lichens by Mr. W. Joshua. The Lichen Flora of Great Britain by Rev. W. A. Leighton, a new edition, the 3rd, just issued. New Fungi of the Jura by Dr. L. Quelet.—A. P. M.

Distinction between Carex intumescens and C. Grayi.—Mr. W. B. Hemsley, in the Journal of Botany, states that he has discovered a very good distinctive character between *Carex intumescens*, Rudge, and *C. Grayi*, Carey, which is not mentioned in the definition of the species in either "Gray's Manual" or "Boott's Illustrations." This differential character is in the achenes; "those of *C. Grayi* being

nearly globular, with a slender style, and indistinctly three-ribbed; whilst those of *C. intumescens* are elongated and sharply triangular, with concave facets."—A. P. M.

The Gymnospermy of Coniferæ.—A paper in *Flora* for June, 1879, nos. 17 and 18, bears this title and is written by Dr. L. Celakovsky. In the Am. Journal for October, it is reviewed by Drs. Engelmann and Gray, as follows: Celakovsky, who takes a high position as a morphological botanist, mentions that in the year 1874, he published in *Flora* an article opposing gymnospermy. He now announces that he has changed his opinion, having satisfied himself of the truth of this doctrine. The agent of conversion was a monstrosity of the Norway Spruce cone, like that from which Stengel made out the now accepted morphology of the cone, and the same monstrosity as that which Braun studied in the Larch, deducing from it the accepted doctrine many years ago. The essential point in this monstrosity is that the bracts of the abnormal catkin develop into leaves, and the carpellary scale before it into a pair of leaves transverse to the bract. The abietinous carpel consists of these two leaves united by their posterior edges (*i. e.*, those next the axis of the cone) into a scale, the back of which therefore faces the axis of the cone, and bears the ovules. The lower part of these catkins is usually normal, the apex by prolification is gradually transformed in the manner here specified, and becomes a leafy branch. Dr. Engelmann, in this Journal, three years ago, gave a confirmatory account of an analogous monstrosity in the Hemlock Spruce, but in which the transformation was at the base of the cone, the lower bracts leaf-like and with a pair of leaves in their axil, the following bracts more and more scale-like, the geminate leaves in their axil were partially united, next forming a scale with a cleft or notched apex, then an entire carpellary scale, in the axil of a normal bract.

Celakovsky, having now seen the Spruce monstrosity for himself, adopts the inevitable conclusion, and applies it well to the settling of the question of gymnospermy. He declares that the dorsal origin of the ovules of the *Abietineæ* proves that it is no axillary production, and thus the main support of those who take the ovule for a simplified female flower falls to the ground. Moreover, the ovules of *Coniferæ* in retrograde metamorphosis never change into shoots, but simply disappear. If flowers, they would be expected sometimes to become foliaceous branchlets. So Celakovsky regards it as demonstrated that they are outgrowths from the dorsal face of the leaf, an-

alogous to the sori and indusia of Ferns. He cites the indusium of *Hymenophyllum* as an instructive analogue, only it is marginal; that of *Davalia* is somewhat dorsal; that of *Cyathea* wholly so and yet cup-shaped. He goes on to say that the gymnospermy of *Abietineæ* being thus proved, that of the rest of *Coniferæ* follows of course; that Braun has seen similar prolification in the catkins of *Taxodineæ*, in which the carpel-scale in *Abietineæ* consists of two leaves, the bud may in other cases develope more than two leaves, so that the lobed scale of *Cryptomeria* may be composed of as many leaves as there are lobes. Moreover, although the ovules in *Abietineæ* originate from the scale, the greater part of the scale is developed after the formation of the ovules; and in *Cupressus* the scale is developed even as late as the following spring, while the ovules are produced in the autumn. However the case may be disguised, Celakovsky asserts his firm conviction, 1st, that an ovule can only be developed as depending on a carpel, and, 2d, that its nucleus represents the macrosporangium of vascular Cryptogams. He adds that this is the logical consequence of the theory of descent, and must be true if the doctrine of the genetic connection of the vegetable world is true. He considers that Van Tieghem and Strassburger have proved the seemingly simple scale of *Cupressineæ* and *Taxodineæ* to be composed of bract and carpel-scale united [which indeed is evident in *Taxodineæ*], and that Braun has confirmed this by the study of proliferous cones. As to the developement of ovules earlier than the carpels they belong to, this is said to have been observed in some Angiosperms also, as in *Cuscuta*, in which at first four naked ovules appear. The anatomical organogenist may argue from this that ovules and carpels are independent productions, but Celakovsky insists that he will argue wrongly.

This brings our author to the consideration of the structure of *Taxineæ*. This is environed with difficulties, and explanation is only conjectural. Here the disc, arillus, cupula, or whatever it be called, makes its appearance where no trace of carpellary scale is to be seen. Celakovsky inclines to the view that this organ, occurring in whatever form, is most probably the carpellary scale itself, very tardily developed. In *Dacrydium* the cupule is homologous with that of *Taxus*, but oblique. *Cephalotaxus* has no scale and no cupule, but seems to correspond with *Cupressineæ*, and shows at maturity a small flattened rudiment between the two ovules, which is probably a rudimental carpel-scale. *Gingko* is the most puzzling; yet it seems probable that the biovuliferous peduncle represents the abietinous carpel-

scale, the peduncle itself being its elongated base. The cupule of *Taxus* may be either a simple circular carpel, or may consist of more than one carpel. The apparently terminal ovule of *Taxus* and *Torreya* he would regard as axillary to one of the uppermost subtending bract-scales; for he will not concede that the ovule can be wholly destitute of a carpellary organ. Yet he might do so, in one sense; for if the carpel may develope very late and very imperfectly or very little, it may sometimes not visibly appear at all, and so the phyllome be reduced to the ovular outgrowth.

Finally, Celakovsky notes, that if the ovule of *Taxus* and *Torreya* be axillary to an uppermost scale, it would originate not from the dorsal but from the ventral face, *i. e.* from the upper side of the leaf; which would distinguish *Taxineæ* from all true *Coniferæ*,—a view which would not be destitute of important support. For both Braun and Mohl have seen apparently androgynous scales in some *Abietineæ*. In a monstrous Larch ament, among carpellary scales with normally dorsal ovules, Braun found one with ovules on the opposite face; and Mohl describes and figures an androgynous inflorescence of White Spruce, with pollen-sacs on the outer face, and on the other a pair of knobs which from their form and position might be taken for imperfectly developed ovules. But this latter case seems most ambiguous. If it was in a male catkin, the upper part of which had become female by the development of carpel-scales in the axil of stamens partially transformed into bracts (which is the case we have before us in a monstrosity of Hemlock Spruce), then the quasi-androgynous scale in question may have been the normal abietinous carpel-scale itself, with the polleniferous bract behind it and connate with it.

The androgynous spike of Hemlock Spruce before us is below normally staminate; above some anthers are slightly scarious-winged at one side of the projecting tip, another has this wing developed into a bract-like body on the whole of one side; next there is a bract with a single small pollen-sac on one side of its back and in its axil a well-formed and biovulate carpel-scale.

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VACCINIUM MACROCARPON, var. INTERMEDIUM.—This name may be given to a form which occurs on the Columbia River, is probably that which in Hooker's Flora is said to occur at its mouth, and is collected higher up, in Washington Territory by Mr. Suksdorf, who sends both flower and fruit. When two very nearly related species occur over a wide range in latitude, the assigned differences are apt to fail at some place or other. The form of Cranberry which Mr. Suksdorf supplies has the stature, small leaves, and small berries of *V. Oxycoccus*. In about half the specimens the scaly bud for the inflorescence is leafy-proliferous, in the others not so, thus destroying a character which appeared to distinguish the two species. On the other hand there is in northern Japan and Sachalin a larger leaved plant which I referred to *V. macrocarpon* and Maximowicz to *V. Oxycoccus*, the bud of which is sometimes proliferous; and its larger leaves equal in size those of ordinary *V. macrocarpon*. They have, however, the slight apiculation which renders the leaves of *V. Oxycoccus* acutish in appearance; while in the Columbia River plant the apex of the leaf is almost retuse. To this small point is reduced the only absolute difference between the two.—A. GRAY.

EPIPACTIS HELLEBORINE.—We have from the Secretary of the Syracuse Botanical Club the following note from Dr. Hooker:

"Mr. Dyer has given me your note reporting the *Epipactis Helleborine*, var. *viridens*, which you have been so good as to send. I am really very much interested in this discovery which on various accounts is an exceedingly important one. It shows a connection between the American and European flora of the rarest kind; another instance being the *Spiranthes Romanzoviana*, and a third, *Eriocaulon septangulare*. Another curious point is that your plant should talk with us of the European varieties of the species, that species being so variable a one, that, *a priori*, it would have been expected that the North American form should have differed from all the European ones! This shows a persistence of very subordinate and what are supposed to be variable characters, of a very remarkable kind."—

JOS. D. HOOKER.

Gray's Botanical Text Book.—The small edition which was printed in June last having been exhausted, a second issue has been published, bearing the date of 1880. In it various typographical errors and small oversights have been corrected. The author will be obliged to botanists who use the book to point out any errors they may detect, that they may be hereafter corrected.

Common and Troublesome Weeds near Santa Barbara, Cal.—Mrs. Bingham, of Sta. Barbara, California, being asked what were the most common and troublesome weeds in that region, responds as follows:

"The most persistent weed, in cultivated grounds, is *Malva borealis*, which grows sometimes eight or ten feet high. It dies during the dry season, where the ground is not irrigated, but whenever the ground is moistened for a few hours, the seeds will germinate.

Solanum nigrum grows everywhere, blooming and bearing fruit the year round; very difficult to eradicate and troublesome.

Brassica nigra covers thousands of acres of pasture land, rendering it almost entirely worthless.

The old Californians have a legend, that when the country was ceded to the United States, the Catholic Fathers were so enraged that they determined to curse the ground, and so scattered broadcast the Malva and mustard.

Stellaria media is abundant after the first rains. *Calandrinia Menziesii* is troublesome in wet weather. *Matricaria discoidea* is common. A variety of *Rumex* abounds in wet weather. *Verbena officinalis* is common in damp places all the year.

Lepidium nitidum is common. *Capsella Bursa-pastoris* grows sparingly in some places. *Datura meteloides* is common in some localities. *Silene gallica*, *Marrubium vulgare* and *Erodium cicutarium* are also common. *Erodium moschatum* and *Medicago denticulata* cover large areas and are valuable for pasturage. Along water courses *Plantago major* and *P. lanceolata* are seen in small quantities, and *Nasturtium officinalis* grows in large patches where the ground is moist. *Hemizonia fasciculatis* covers uncultivated grounds in dry weather and is very troublesome. Bees make a very poor quality of honey from it. In cultivated grounds in dry weather we have two varieties of *Chenopodium* and two or three of *Ambrosia*, also several other apetalous plants which I cannot name. *Eremocarpus setigerus* is very abundant in some localities in the dry season.

I have given you the most prominent troublesome plants, and if I was as good a botanist as I would like to be, might tell you more."

Similar information from other districts is solicited.—A. Gray.

Viscidity as a Seed-distributor.—On a recent short botanical excursion with a thirteen year old son, he called my attention to a bunch of dried stems of *Cerastium nutans* which by his pocket lens he had discovered to be "covered with small lice sticking to the glands." These proved to be seeds, which, adhering in this way to the sticky stems, were thus blown to long distances, and widely distributed! We have had suggestions that viscid glands are for the purpose of absorbing nitrogenous matter,—for obstructing the advance of unwelcome guests,—possibly for some other purposes,—but I have never heard of the seed-distribution. We know that when a dead cat is placed at the root of a grape vine, the plant is often invigorated thereby, but we do not believe that cats were especially designed for grape vine roots, or the roots especially adapted for feeding on dead cats, though indirectly this may be so, and I fancy much of what we hear about "arrangements" in plant structure or behavior, amounts to but little more. Still it is always a gain to know the *fact*, whatever it may be, hence I send you this note.—T. Meehan.

Notes from St. Augustine, Fla.—I suppose that as I write, Oct. 21st, the collecting season is nearly over for northern botanists, while here the wild flowers are blooming in great profusion, and will continue to do so for two or three weeks longer. In ordinary seasons the last two weeks of November and the whole of December afford very little of botanical interest in this section. Nature seems to take a short rest, and January begins the season again with *Viola lanceolata*, *V. cucullata*, *Oldenlandia rotundifolia*, and perhaps *Pinguicula lutea*, *P. pumila* and *P. elatior*.

September and October of this year have been terribly rainy months, making collecting almost impossible. However, four or five days just spent at a "settlement" a few miles from St. Augustine, have yielded good returns. We passed one day, notwithstanding frequent showers, in voyaging over the pine-barrens in a Florida cart, going wherever there seemed to be anything worth gathering. The wet season had caused acres of pine-barren land to bloom with *Bigelovia nudata*, DC., while here and there the milk-white corymbs and blossom-stems of *Cacalia ovata*, Walt. made that pretty flower very conspicuous. I saw three or four small specimens of *Hydrolea corymbosa*, Ell. although it is now late in the season for it. It is very beautiful with its bright blue corolla and filaments and golden anthers. There were immense, partially submerged patches of the aromatic *Herpestis amplexicaulis*, Pursh., the bright blue of its blossoms nearly

rivalling my pet *Hydrolea*. *Tiedemannia teretifolia*, DC., well named for its curious "terete petioles destitute of leaflets," delighted in the swampy condition of the country and was quite plentiful in some places, though nearly out of flower. *Gerardia purpurea* and a few late blossoms of *Erigeron vernum*, Torr. & Gray., showed themselves occasionally, while *Lobelia glandulosa*, Walt., raised its purplish-blue spike gracefully above the surrounding grasses and sedges. The exceeding brittleness of the stems of this plant makes it rather difficult to press good specimens. Before reaching the "Cabbage hammock" which was our goal, and where we proposed searching the *Sabal Palmetto* trees for *Polypodium aureum*, *Vittaria lineata*, and *Ophioglossum palmatum*, our horse forced the cart through a quarter of an acre of *Pontederia cordata*. The plants averaged four feet in height, and were in full bloom. Among the *Herpestis amplexicaulis* I saw two or three belated flowers of *Piriqueta fulva*, Chapm., and on the edge of the swamp *Kosteletzkya Virginica*, Presl., in blossom. The latter varies very much; in fresh water swamps the plants are generally not much branched and rather weak and diffuse in habit, with small leaves; while in brackish marshes they grow from four to six feet high, very stout, with large leaves. These leaves are strongly rough-hairy, and when a person "rubs the cheeks with them to get a good color" the stinging sensation lasts several minutes. When we reached the "hammock" we fastened the horse, and then carefully picked our way from one comparatively dry place to another, jumping from knoll to knoll or from root to root. Not a fern of any kind rewarded our search, except the common *Polypodium incanum*. Two or three mosses, whose names I do not yet know, were in good condition for collecting, and while looking about for others I spied what seemed to be a flower stem from which all the petals had fallen. I soon saw that it was an orchidaceous plant which I had never seen, and analysis proved it to be *Microstylis Floridana*, Chapm., assigned in the "Southern Flora" to "Apalachicola, Florida" as its habitat. It has two pretty green ovate leaves, and a slender raceme of small curious flowers. The plant is easily overlooked, but a careful search enabled me to secure about thirty good specimens. We found nothing else of special interest in this place, and soon entered the cart upon our return voyage over the watery barrens. Again we pass through masses of yellow *Bigelovia*, and presently reach a place where there are a number of plants of the bright *Coreopsis gladiata*, Walt. This plant is very graceful as it swings its slender stem to and fro in the breeze, showing its deep yellow ray-flowers to good advantage. As we come out

upon high dry sand ridges, we find a brilliant show of fall flowers. Of these one of the most beautiful is *Petalostemon corymbosum*, Michx. which grows plentifully on two or three especially dry ridges. Each root sends up a large cluster of simple stems which are about two feet high, each stem crowned with a corymbose spike of white flowers. One interesting peculiarity of this flower is the calyx, the "teeth" of which are "setaceous, plumose." In the days when my botanical knowledge of Florida flowers was very small, these same plumose teeth puzzled me very much, for they deceived me, and made me try to place the plant in the Composite family. When my blunder was pointed out by a kind friend, and I read Wood's description of this species in his "Class Book of Botany," how I thanked the author for his remark that the "heads resemble the *Compositæ*, with red scales, and lance-oblong petals." *P. carneum*, Michx. resembles *P. corymbosum*, but the solitary heads are rather larger and fewer, and it is readily distinguished by other characteristics. *P. gracile*, Nutt., grows in the wiry grass of the barrens, and sometimes it is necessary to find the roots by tracing the diffuse, perhaps nearly prostrate stems from the flower heads to the root, carefully picking away the tangled grass. The lengthened head of this Petalostemon gives it the common name of "Thimble-top." One especially dry place, where the earth is chiefly pure white sand is the only locality of which I know for *Gaillardia lanceolata*, Michx. The plant is quite peculiar in its aspect with its few small leaves and large flowers. The ray-flowers are yellow above and red on the under side, while the disk flowers are a very dark purple, nearly black. *Liatris elegans*, Willd., is a striking ornament to the "piney woods," with its brightly-colored flower-bracts. Some spikes are two feet long and an inch or more in diameter, while an occasional stem has been "topped" by accident and has sent out four or five small spikes. This majestic Liatris is truly elegant, and well deserves its name. Two other handsome species are *L. gracilis*, Pursh. with its slender spike of deep purple flowers, and *L. spicata*, Willd., with its large spike of bright light-purple blossoms. The "Florida vanilla," *L. odoratissima*, Willd., is just out of blossom. I saw one flower stem, which was over five feet high; the usual height is about three feet. Several low, wet places were full of *L. paniculata*, Willd., and I suppose that a little farther south, *L. fruticosa*, Nutt., will soon be in bloom. I have never seen it near St. Augustine, but last year while going down to the Halifax river in December, I saw plenty of it just out of bloom. All our species, except the last three, have tuberous roots, and *L. fruticosa*

is shrubby. We passed gay patches of pink *Gerardia filifolia*, Nutt., and yellow *Seymeria tenuifolia*, Pursh; stray plants of *G. parvifolia*, Chapm. all tangled up in the grass; bright golden-yellow *Chrysopsis decumbens*, Chapm. and *C. trichophylla*, Nutt.; pretty white heads of *Palafoxia integrifolia*, Torr. & Gray; black rayless heads of *Helianthus Radula*, Torr. & Gray with its pretty rosette of four large root-leaves lying flat upon the ground; a species of white *Sabbatia*, and two or three varieties of bright yellow "wild sun-flowers." Where the barrens had been burned over, that sure follower of the fire, *Hypoxys juncea*, Smith, had sprung up, and was already in bloom. In rich muddy places especially near houses, *Scoparia dulcis*, L., was an untidy weed. Another of our beautiful fall flowers, *Polygonella parvifolia*, Michx. was just coming into bloom. This tiny delicate flower is very dainty and attractive. It grows in short racemes which make a crowded panicle. The sterile flowers are generally of a pure white color, while the fertile are a yellowish green or bright pink. This *Polygonella* makes a pretty addition to grass boquets, as it keeps its color and remains secure upon the stem. Of the many other plants that we saw, I have only room to mention *Siphonychia diffusa*, Chapm. This is a very pretty plant; the prostrate stems form mats upon the ground, and the tiny pinkish-white flowers are in numerous "compact, rectangular cymes, terminating all the branches."—

MARY C. REYNOLDS.

NEW SPECIES OF FUNGI, BY CHAS. H. PECK.—ÆCIDIUM MONOICUM.—Spots none; peridia generally crowded, occupying the whole lower surface of the leaf, subcylindrical; spores subglobose, bright-yellow, .0008–.0011 of an inch in diameter, generally with one to three shining nuclei; spermogonia on different leaves of the same plant.

Leaves of *Arabis retrofracta*. Colorado. *T. S. Brandegee*. Communicated by *E. A. Rau*.

From the notes of Mr. Brandegee we learn that early in March when the host plants begin to grow, those affected by the fungus begin to look sickly. They soon turn yellow and never blossom.

ÆCIDIUM POLEMONII.—Spots suborbicular, pallid or greenish-yellow, sometimes confluent; peridia hypophyllous, crowded, short; spores globose or subelliptical, bright orange, .0008–.001 of an inch in diameter, minutely rough; spermagonia central on both sides of the leaf.

Leaves of *Polemonium reptans*. Iowa. May. *E. W. Holway*.

ÆCIDIUM GILIÆ.—Spots pale-yellow; peridia scattered or crowded, short, pustuliform, hypophyllous, rarely also epiphyllous, opening

by a small aperture; spores orange, angular or subglobose, .0008–.001 of an inch in diameter, generally with one to three shining nuclei.

Leaves of *Gilia Nuttallii*. Alta, Wasatch Mts., Utah. August. Altitude 8,000 feet. *M. E. Jones.*

ÆCIDIUM INTERMIXTUM.—Peridia scattered, hypophyllous, short; spores subglobose or elliptical, orange-colored, .0008–.0012 of an inch broad.

Leaves of *Iva axillaris*. Green River, Wyoming Territory. July *M. E. Jones.*

This occurs in company with *Puccinia intermixta* of which it is probably a form. In some instances the *Æcidium* was on the lower surface of the leaf and the *Puccinia* on the upper surface, in others both were intermingled on the lower surface.

CENANGIUM PLATASCUM.—Cups small, clustered, at first with a white margin, then plane and black margined; asci numerous, ovate or subspherical; spores oblong-ovate, fenestrate, slightly colored, .0008 of an inch long, .0005 of an inch broad.

On bark. Alabama. *T. M. Peters.*

SPHÆRELLA MEGASTOMA.—Perithecia minute, numerous, amphigenous, at first covered by the epidermis, then erumpent, black; ostiola large, circular, pale within; asci subcylindrical; spores uniseriate or sometimes crowded, oblong-elliptical, granular within, greenish-yellow, .0004—.0006 of an inch long.

Living and languishing leaves of *Astragalus bisulcatus*. Colorado. July. *M. E. Jones.*

This fungus appears to attack the leaves while living and to cause their death.

THE COLORADO BERBERIS.—One dislikes to call attention to errors upon the pages of so excellent a book as the Botany of Lieut. Wheeler's Surveys, but in that work one plant is given as "common in the mountain parts of Central Colorado," which, I venture to say, does not occur in Colorado at all, *i. e. Berberis Aquifolium*, Pursh. I have seen acres of that shrub in the mountains of California, but after six seasons of botanizing in different parts of Colorado, I have to say that I never met with it here. *Berberis repens*, Lindl., which Dr. Rothrock says he did not see, is common enough in the mountains of Colorado. This very different species, formerly considered a variety of *B. Aquifolium*, was so designated in the earlier catalogues of Colorado plants; but since the specific rank which it merited has been conceded to it, the name of *B. Aquifolium* should be dropped from the Rocky Moun-

tain list, unless some one can show a specimen of that species from the region in question.—Edward L. Greene, *Creswell, Colorado.*

The Michigan Trillium described in the July number of the Gazette I have found here several times, and always associated with *T. grandiflorum.* Judging by the company it keeps I long since regarded it as only a freak of *T. grandiflorum.* During the spring specimens of it were sent to me from Lockport, N. Y., by Prof. A. B. Evans, and afterward that gentleman informed me he had again found it, and that it grew from the *roots* of *T. grandiflorum.* It is not entitled to rank as a variety, being, as Mr. Smith says, a *lusus naturæ.*—

S. H. Wright, *Penn Yan, N. Y.*

Melanthium Virginicum.—An article in a recent number of the Bot. Gazette on *Melanthium Virginicum*, brings to my mind that, about 12 years ago, it was abundant in this vicinity, but is now rarely seen. The reason of this is that the places where it grew have been cultivated and grazed so as to destroy it. This summer I found it, May 1, in Greenwood Co., Kansas, very abundant on a southern exposure on sandstone hills. Again after the middle of June I observed it quite abundant on line of Missouri and Kansas at west line of Cass Co., Mo., apparently having just bloomed.—G. C. Broadhead, *Pleasant Hill, Mo.*

The Floating Fern.—It was announced a year ago that sterile specimens of the *Ceratopteris thalictroides* had been found in Southern Florida. I am now able to offer complete specimens of this extraordinary plant as part of my fourth fascicle of Southern plants, and also of a fascicle of twelve Floridian Ferns which I have prepared to meet the wants of numerous applicants. The specimens for these sets have been prepared with much care, nearly all having roots, without which specimens of Floridian ferns are quite incomplete. The giant *Acrostichum* is represented by sections of the sterile and fertile fronds.

The *Ceratopteris* being extremely variable, I shall give two or three plants for a specimen and in each specimen shall endeavor to illustrate its peculiar mode of propagation, which is by marginal buds, exactly as in *Bryophyllum.* These arise from old sterile fronds, very rarely from fertile ones, the latter being erect, while the former mostly float. From Prof. Eaton's article relative to this fern it would be inferred that the *Ceratopteris* roots like *Sparganium* and *Pontederia.* Where I found it, somewhere in the vast inundated prairie region north of the Everglades, it was floating free (exactly like *Pistia* and

Azolla) in water ten feet deep. The fronds are arranged in rosettes, each having roots of its own. The young ones are central, of the usual crosier shape and the spongy stipes bear a few hyaline, cup-shaped scales.

Cheilanthes microphylla I have not found in a second locality, although I have explored 200 miles of the eastern coast of Florida pretty thoroughly. In October I revisited its station and found it much better developed than last year, when the weather was extremely dry. I secured all the fruiting specimens and will distribute them. I decline to make selections of less than 100 specimens, except in the case of these twelve ferns, which are put up in uniform sets, with printed labels, and sold for $1.20. For packing and postage 30 cents additional is charged on any number of sets sent to one address.—

A. H. Curtiss, *Jacksonville, Fla.*

Fern Etchings by John Williamson, author of Ferns of Kentucky. Louisville: John P. Morton & Co. Ed. 1.—A little more than a year ago appeared the modest "Ferns of Kentucky" illustrated by lithographic plates transferred from etchings by Mr. Williamson, the author of the work. Many of these plates were quite excellent and still more showed that had the original copper plates been used the results would have been much more satisfactory, as the delicacy of the etchings were lost by the process of transferring.

Mr. Williamson himself seems to have appreciated this fact, for in his new work we have the etchings themselves, printed in most cases in a very beautiful manner.

The volume, which is about 8x10 inches, contains plates of sixty-eight Ferns, natives of the United States, which is about one-half of the species known to inhabit this area. The description of each species will be found opposite the plate and has been taken from the works of Prof. Gray and Prof. Eaton. The very best of the plates of the "Ferns of Kentucky" are used in this volume, but these are but few. By far the larger portion are entirely new, while the others are the same species as in the former book from vastly improved plates. It would be impossible to select any particular plates to mention as best, for all are so perfect. The smaller species of ferns are of course best represented, as the entire plant can be brought within the compass of the page. The larger ferns are excellent but it is to be regretted that they should not have been etched on larger coppers, as the excellence of the portions of them which are given creates a desire for the whole.

Plates 1, 5, 9, 15, 17, 36 and 50, representing the smaller ferns, and plates 10, 13, 31, 35, 40 and 52, representing the larger growing species, seem to possess superior excellence. In fact many of the plates of this book would be eagerly seized upon by the virtuoso if met with among a collection of etchings, as a great prize. Mr. Williamson is a man who does this work, not because he desires to emulate the work of eminent botanists, but because the ability to do it is in him and he can but allow it to manifest itself. Mr. Williamson's occupation and circumstances are such that he does not possess the leisure time which is often at the command of the amateur to spend upon the work he so much enjoys, making the result so much the more to be wondered at.

The volume before us is dedicated to a mutual friend of the author and the present writer, and it is with unfeigned pleasure that the latter commends the author's taste in selecting one to honor who, like himself, works against surroundings for the love of the branch of science in which he labors.

As the number of species represented is about one half of the known ferns of the country, and a second volume would include all, it makes the price of the volume, which is $7.50, very much less in proportion than is charged for the works usually met with occupying the same field, thus bringing it within the limit of many more persons than is generally the case.

It is to be hoped that the sales of this volume will be such as to warrant the completion of the work, and if such should be the case the public, and pteridologists particularly, would have a rare volume if Mr. Williamson succeeded in carrying it as far beyond the present one as this is superior to his first book, "Ferns of Kentucky," which, judging from his work thus far, he may do.—John Robinson.

Tension in an Oak.—Near New Birmingham, Ohio, is a good sized White Oak which furnishes so good an illustration of the tension of tissues that it is worth while noting. The tree had been cut into on one side, just fairly into the sap wood, and then left. Being exposed to a heavy wind it was so bent away from the cut side that the slab split up the tree some ten feet, its cut end slipping entirely out of its former resting place. The connection above was perfectly retained and hence the slab continued to live, projected at a small angle from the tree. The lower end, after slipping out from its support, has so elongated that it is now nearly two inches too long to occupy its former position. There has also been a healing up and barking over

of the cut end so that the overlapping seems to be exaggerated. In a young and growing plant if the pith and woody zone are separated the former will elongate and the latter contract and hence make quite an obvious difference. But elasticity is diminished in the older and more established parts of a plant, and to have such a difference between the layers of forming and permanent tissue in the wood is more than I looked for.—J. M. C.

Fourteen Weeks in Botany by Alphonso Wood, A. M., and J. Dorman Steele, Ph. D. (A. S. Barnes & Co., 1879).—The parts of Steele's "Fourteen-Weeks" series have not been remarkable for their accuracy of statement nor for peculiar aptness of presentation and the present volume fully sustains the reputation of its predecessors. We are not told whether the plan of the work was originated by Prof. Wood or Dr. Steele or whether it was produced by the combined wisdom of the authors. Certainly in its use they lay the book open to very severe criticism. Instead of presenting the subject in a logical way, the pupil is introduced at once to *Polytrichum commune* and *Bartramia pomiformis*, two mosses, under each of which is a very meager description. Following these are lessons on *Polypodium* and *Osmunda* in the order which is pursued throughout the book, Description, Analysis, Name, Classification with a list of terms defined in the section and with them the Cryptogams are dismissed. Seventy plants are thus described and from these, with an utter lack of treatment in any general way, a pupil is expected to obtain an idea of the science of botany. The technical terms, being defined only as they are needed in speaking of a particular species, are of course presented without any regard to their correlation. We take a list of these at random. "Aestivation, Albumen, Centripetal inflorescence, Herbaceous, Imbricated, Introrse, Opposing stamens, Pedicel, Pyxis, Quincuncial, Raceme, Rachis, Sessile, Tuber." (p. 43.) But we are told in the preface that the book "is not designed for infants; the rather for learners capable of thought and reason." Now is there any *reason* in thus mixing things in order to present them to learners "capable of thought and reason"?

Not content with veinlet, on page 21 we have the term *veinulet* introduced. We are also told that the genera *Cardamine* and *Dentaria* are one, taking the older name *Cardamine*. (p. 103) In speaking of hairs (foot-note, p. 104,) it is said, "In the Nettle they are hollow with a bag of poison concealed." Why not tell a reasoning pupil the exact truth which is more wonderful than this fiction? On page 116

the remarkable statement is made that "It will now be seen that from the leaf alone or any fragment of it, the place of the plant in the natural system of classification can be determined." Hardly, with the knowledge at the command of the ordinary pupil.

The casual observer will be at once struck with the extreme *floweriness* of the *style*. Under the description of the Dog-tooth Violet we read; "Spring has come again. The winds blow soft from the West and South over the melting snow-banks. Birds once more fill the air with song, while plants awakened from their winter's sleep, put on their robes of leaf and flower." (p. 29.)

"May, charming May, is the festival of the Roseworts." (p. 104.)

There is one excellent feature of the work, the extreme accuracy of the illustrations. This is not at all surprising when the names of the designers of the majority of the cuts are known, viz: Mr. Isaac Sprague, "the most eminent of living botanical artists," and Mr. J. H. Emerton, the delineator of many of the plates of Eaton's "Ferns of N. A." Some of the figures, however, are evidently by less experienced botanists. The drawings of *Sarracenia purpurea* (p. 159.) and *Pinus Strobus* (p. 215.) are certainly unique.

The Gazette for 1880.—As the December and January numbers of the Gazette will probably appear very nearly together, this seems to be the suitable time to call attention to the beginning of a new volume. The Gazette will enter upon its fifth volume with renewed vigor and greater prospects of success than ever before. It will be the constant aim of the editors to make it as attractive as possible, keeping it in that middle path between dry technicalities that would appall the amateur and foolish quibbling that would disgust the professional. We offer no list of contributors, but would simply ask that the numbers of this volume be looked over with the assurance that there will be no falling off in this respect, but a constant advance. The subscription price will be continued at the same low figure and if a botanist is not willing to pay one dollar for 150 pages of such notes as the Gazette contains, he must be poor indeed. We would ask for the continued patronage of our old subscribers and urge them, if not for our sakes, at least for the common good, to increase the number of our patrons as far as they are able. No sample copies will be distributed at the beginning of the year, as has been the custom formerly, and no numbers will be sent after the subscription has expired. We urge, therefore, that all who expect to subscribe do so at once, that our list may be made and that there may be no awkward break at the beginning of the year. Remember also that if notes accompany a subscription it will be none the less acceptable.—Eds.

BOTANICAL GAZETTE.

Vol. IV. DECEMBER, 1879. No. 12.

Dimorpho-dichogamy in Juglans cinerea, L.—All the trees of this species which have come under my observation range themselves clearly into two distinct sets as respects the relative development of their sexual organs. In one set the stamens mature some ten days in advance of the pistils on the same trees. In the other set, however, they are at this time just ready to receive pollen, while the stamens which accompany them only develop and shed their pollen in time to fertilize the pistils of the set first mentioned. This simply is the monœcism of the species carried one step further, and self-fertilization becomes scarcely possible.

As respects the bearings of this arrangement on the fertility of the plant it is obvious that isolated trees, or those otherwise unfavorably located with respect to their fellows, must be liable to sterility; and, likewise, that weather favorable or unfavorable to the transmission of pollen by the wind, or to the operations of insects among the flowers, prevailing earlier or later, when either corresponding set of sexual organs is at full development, must for that year influence the fertility of one half the trees.

It is desirable that some one favorably located will observe the behavior of the other species in this regard. Our species of *Carya*, also, need attention, for I have seen in this genus at least a disposition to assume the same arrangement.—C. G. Pringle.

Leaf-propagation of Nasturtium lacustre, Gr.—Early in July this plant, then coming into flower, begins to cast its leaves, commencing with the lowest and most dissected and progressing upward along the stem even to the small entire ones on the branches. They fall not in the least withered or faded with age, but while still green and gorged with elaborated material for growth, as soon, in short, as they have attained their fullest development. Alighted on the surface of the soft mud or ooze, which is the habitat of this species, each leaf puts forth from a minute bud at its extreme base a young plant which develops stem and leaves simultaneously with roots, absorbing and appropriating the nutriment stored in the leaf, whose frame in a short time decays, while the plantlet goes on in an inde-

pendent existence. The plants propagated by the leaves have one year's start of those resulting from the seeds of the same year; but upon the latter, borne away by the fall and springs floods, the plant must chiefly depend for its dispersion.—C. G. Pringle.

The Autumnal Flora of Fortress Monroe.—Stretching north two or three miles from the Fort, is a sandy region from a quarter to half a mile in width, washed on the east by the waters of the Chesapeake Bay, and on the west by a shallow arm of the same. The sand on the seaward side has been drifted into a succession of low hills or dunes perhaps twenty-five feet high. These are covered with thickets and have proved to be very attractive hunting-grounds to the botanists.

On the 20th of Sept. the writer, in company with Dr. Vasey, spent the day in supplementing previous collections made in the same vicinity in the spring.

Starting from the wharf we found growing in the pure sand *Diodia teres*, with a vigor, closeness of growth and profusion of crystalline bristles, quite unlike the usual forms. Closely associated we found *Salsola Kali*, *Œnothera humifusa*, *Cynodon Dactylon*, *Euphorbia polygonifolia*, and that vile pest, *Cenchrus tribuloides*. Crossing the parade ground of the Fortress with its noble groves of *Quercus virens*, and its tropical looking gardens with Yuccas, Figs, Lagerstrœmias and other unfamiliar shrubs, we descend the ramparts and come to a salt marsh. Here we find *Borrichia pubescens*, (a few late flowers), *Iva frutescens* and *imbricata* (not in Gray's Manual), *Salicornia herbacea*, *Virginica*, and *fruticosa*, var. *ambigua*, *Suæda maritima*, *Baccharis halimifolia*, *Bryzopyrum spicatum*, *Statice Limonium*, and *Rhynchospora inexpansa*.

In drier localities *Solidago sempervirens*, and (strange to say) *Riddellii*!!, *Aristida purpurascens*, *Tricuspis purpurea*, *Cakile Americana*, *Vilfa Virginica*, and spreading sometimes 10 feet over the sand, *Phaseolus diversifolius*. *Opuntia vulgaris* covers acres. Coming to the first of the sand hills, we find it covered with dense thickets of *Quercus virens* and *cinerea*, finely in fruit (its farthest northern limit). *Myrica cerifera*, *Prunus maritima*, *Zanthoxylum Carolinianum*, *Bumelia lycioides*, and these shrubs over-run with *Smilax glauca* and *tamnoides*, all these in fruit. *Vitis vulpina* is abundant and were it a fortnight later, its clusters would be inviting. Among these hills we find also *Panicum amarum*, *Uniola paniculata*, *Monarda punctata*, and *Andropogon argenteus*. Passing to the landward side of the hills we find groves of *Pinus Tæda*, intermingled with *Ilex opaca*. One old

Holly, much damaged by high winds, measured, at 4 feet from the ground, 69 inches in circumference. *Centrosæma Virginiana* is very abundant and conspicuous with its long and slender pods. *Eupatorium hyssopifolium* and *fœniculaceum*, *Desmodium strictum*, *Helianthemum corymbosum*, *Callicarpa Americana*, with its showy axillary clusters of purple fruit, *Lespedeza Stuvei*, *Galium hispidulum*, *Elephantopus nudatus*, *Eragrostis tenuis*, *Cyperus Grayii*, and *ovularis*, with *Paspalum ovatum*, Sim.!!! a South American species, are among the plants collected through the woods.

Previous explorations have detected *Allium striatum*, *Pyrus angustifolia*, *Juncus Rœmerianus*, *Jatropha stimulosa*, *Danthonia sericea*, *Muscari botryrides*, and *Senebiera didyma*.

In the vicinity of Hampton are found *Lolium temulentum*, *Cirsium horridulum*, *Senecio tomentosus*, *Gratiola sphærocarpa*, *Ranunculus parviflorus*, *pusillus* and *hederaceus*! *Fedia olitoria*, *Amaryllis Atamasco*, *Hydrocotyle umbellata*, *Sagina subulata*, *Briza media*, *Oxydrendon arboreum* and *Rumex pulcher*.

Of most of these, the writer has specimens for exchange.—J. W. Chickering, Jr., *Deaf-Mute College*, *Washington, D. C.*

P. S. On a trip to Luray Cave in June, *Bupleurum rotundifolium* was found in abundance where Dr. Gray detected it 38 years before.

The Geographical Range of Petalostemon foliosus, Gray, in Illinois.—The note of Mr. Boltwood, in the Gazette for October, announcing the discovery of this rather rare plant at Ottawa, raises some questions as to localities where it may yet be looked for. As I found it in 1872 on an island in the Kankakee river, at Altorf, Ill., about eight miles below Kankakee, and as it had been found before by Mr. Burgess Truesdell on the Fox river, in Kane Co., this third locality at Ottawa makes a good connecting link to indicate its probable range. A glance at the map will give us some clue to this. The Fox is a branch of the Illinois, joining it at Ottawa The Kankakee enters the Illinois a few miles above Morris. The valleys of the two streams, together with the upper Illinois, and perhaps lower down, may yet show other stations for the plant. Though I was often during several years along the banks of the Kankakee from Rock creek, below Altorf, to Momence, near the Indiana line, I saw no further indications of the plant, though from some remains, found late one season, it might be looked for lower down the stream. Two years after finding it, I searched long and carefully in the first locality for more, but in vain, though the ground was such that they could scarcely have been concealed. On getting some roots for Dr. Gray, to

plant in the Botanical Gardens at Cambridge, and for my own collection, I was unintentionally too good a collector, and probably extinguished the plant, though thinking enough had been left for seed. Dr. Gray, on requesting the plants, said they were difficult to raise from the seed, which may account for those left disappearing the year after the first and second crop of specimens was reaped, there being but few at the best. It grew on the gravelly banks of the river, and it would be well for collectors to look for it in similar situations within the range above indicated, at least, with the precaution, if found, of not cropping too closely, unless there is an "abundance" at Ottawa for all who may seek it personally or by exchange.—

E. J. Hill, *Englewood, Ill.*

Alternation of Generations.—A discussion of the subject of the "alternation of generations" in the Journal of Botany for November, may be given in brief as follows:

So far back as 1849, Hofmeister pointed out that the prothallium of the Vascular Cryptogams is morphologically equivalent to the *moss-plant;* that a Fern or a Lycopod is the homologue of the *moss-fruit;* and further that in both Mosses and Ferns the asexual is interrupted by a sexual reproduction, this interruption occurring at an earlier stage in Ferns than in Mosses, and that the sexual and asexual generation regularly alternate.

So soon as these views were generally accepted, attempts were made to apply them to the life-histories of the Phanerogams on the one hand and of the Thallophytes on the other. Such an application is rendered difficult in the case of the former group, by the very intimate connexion of the two generations in the ovule, which makes their exact distinction a matter of some uncertainty; and in the case of the latter group by the more or less complete independence of the two generations and by the frequent repetition of the one before the recurrence of the other.

The generations of Thallophytes, like those of Cormophytes, begin in all cases with a free cell, the spore, but unlike those of Cormophytes, the generations are distinct and do not remain in organic connexion; consequently it is impossible to regard the "fruits" of Thallophytes as representing an entire generation.

The fact that such groups as the *Conjugatæ* and *Fucaceæ* exist, which exhibit no alternation of generations is presumptive evidence against it. It seems to be more in accordance with the fact to say simply that a sexual Thallophyte may reproduce itself either sexual-

ly or asexually, the mode of reproduction depending more especially upon the external conditions.

Speaking generally, it is not possible to say of a *spore* of any given Thallophyte that the product of its germination will necessarily be a sexual plant, nor is it possible to say of the *oospore* that the product of its germination will be necessarily an asexual plant.

The results of the discussion are summed up as follows:—It appears that it is impossible to detect any distinct alternation of generations in the life-histories of Thallophytes, with the exception of the *Coleochaetæ* and the *Characeæ*.—A. P. Morgan.

Melanthium Virginicum.—Seeing Mr. Broadhead's notice of the above species I would like to give my observation about it. I found this beautiful plant first in 1874, on a piece of woodland where the underbrush was very small, along with *Stenanthium angustifolium*. But as soon as the underbrush grew higher it was nearly gone. This year upon another piece of woodland, where I had before only once found a few specimens, the bushes had been burned, and I found *Melanthium Virginicum* in great abundance. It also grows abundantly on the Missouri Pacific Railroad, between here and Kirkwood. It is evident that the plant likes air and light. If the light is excluded, the bulbs simply remain in the ground and do not grow.—

H. Eggert, *St. Louis, Mo.*

The Genera Plantarum of Bentham and Hooker.—The first part of the third and concluding volume of this important work—to comprise the remaining Dicotyledonous orders—is now in press, and will be published in London at the close of the year. It is convenient and may not be improper to announce in the Botanical Gazette, that most of the botanists of the United States who possess this indispensable work thus far have procured it through the mediation of the subscriber, who, in view of the number of copies thus taken is supplied at a considerable discount, the whole advantage of which inures to the recipient. The two volumes already completed are published at £5, 6, 0. The price charged the subscriber is £4, 8, 0. The new part will be furnished at a similar discount. Botanists who have in this way obtained the published parts, and who wish to receive the remainder through the same channel, are requested to communicate their wishes in this respect, without delay, to The Curator of the Herbarium of Harvard University, Cambridge, Mass.—

Asa Gray.

January Flora of the Indian River Country, Florida.—The species common to this section are pretty well known and I anticipate that our friend Mr. Curtiss, who has spent the entire summer in botanical work on the Indian River, will give us very interesting results, but for the purpose of showing what may be found in that sunny land whilst our own north is frozen, bleak, and barren, I have preserved the following list of plants collected by me from Jan. 10th to Jan. 15th, 1879. Some are probably autumn forms not done flowering. Others are early spring bloomers. However, I found them all very abundant and they looked very inviting at this season of the year. On the low wet pine barrens I gathered *Lobelia glandulosa*, *Liatris paniculata*, *Heterotheca scabra*, *Ericocaulon gnaphalodes*, *Sagittaria natans*, *Hypericum fasciculatum*, *Drosera capillaris*, *Chaptalia tomentosa*, *Pinguicula lutea*, *P. pumila*, *Polygala lutea*. The following were collected on dry sandy barrens: *Eupatorium aromaticum*, *Tecoma radicans*, *Chrysopsis Mariana*, *C. aurea*, and *C. graminifolia*, *Solidago pilosa*, *Erigeron vernum*, *Hieracium Gronovii*, *Aster squarrosus*, *Ascyrum amplexicaulis*, *Sabbatia Elliottii*, *Andromeda nitida*. A month later would no doubt increase the number several times. I intend to make a more thorough examination during the coming winter.—W. W. Calkins, *Chicago*.

The Colorado Berberis.—The November number of the Gazette contains a note from Edward L. Greene relative to an error of mine as to *Berberis Aquifolium*, Pursh., being found in Colorado. The mistake is a palpable one on my part, and as such, the correction is kindly accepted, as indeed any others, made in the same honest spirit, would be.

I would add, however, that the determination of the plant in question was made before the relations of this and the allied *B. repens* were clearly understood. It should have been rectified by me as the volume was going through the press; at which time, however, it was unfortunately overlooked.—J. T. Rothrock.

Fertilization of Yucca.—At the meeting of the Amer. Association last August, Mr. Meehan read a paper bearing the above title. It contains the following statements, and as they will be seen to conflict somewhat, it may be that some of the readers of the Gazette may have the means of proving either Mr. Meehan or Prof. Riley right, or possibly both:

"In the transactions of the Academy of Science of St. Louis of April 15th, 1873, our distinguished associate Dr. George Engelmann

has some "notes on the genus Yucca" in which occurs the following passage: "The conspicuously papillose termination of the pistil had always been considered the stigma, but closer examination showed its papillae to be epidermal appendages, corresponding to similar ones on the filaments, and entirely destitute of stigmatic function; never did they contribute to the development of a pollen grain occasionally adhering to them. Dr. Mellichamp's notice of a drop of glutinous liquid in the tube formed by the coalescense of the so-called stigmas, led me to further experiments. That tube proved to be the real stigma, exuding stigmatic liquor, and insects must be the agents which introduced the pollen into the tube." Subsequent investigations by our esteemed associate Professor Riley, led to the discovery of a new genus of Lepidoptera—*Pronuba yuccasella*—and which has proved to be the insect agent which fertilizes the flower. In the same number of the Proceedings, Prof. Riley describes this insect and says "with her maxillary tentacle, so wonderfully modified for the purpose, she collects the pollen in large pellets, and holds it under the neck and against the front trochanters. In this manner she sometimes carries a mass twice the size of her head. Thus laden she clings to the top of the pistil, bends her head, thrusts her tongue into the stigmatic nectary and brings the pollen-masses right over its mouth. In this position she works with a vigor, that would indicate combined pleasure and purpose—moving her head and body from side to side, and apparently making every effort to force the pollen into the tube. Such is the method by which our Yuccas are fertilized."

It may be remembered that at our meeting at Buffalo I produced three capsules that had not been produced by this elaborate process, but simply by mere touching of the papillose apex with one of the flower's own polleniferous anthers. Prof. Riley was so sure that the seed-vessels could not have been produced in that way, that there must have been some insect agency unknown to me in addition to my work, that at the conclusion of my paper he asked permission to cut open the capsules, sure of being able to show the larvae in the fruit; but he found them not. I recall these matters to show that I have not misapprehended the position our friends take on this question.

I now again exhibit numerous seed vessels from this plant of *Yucca angustifolia* in which no trace of larvae can be found; and seed vessels of *Yucca filamentosa* growing but a few yards from the other, which are infested by the *Pronuba yuccasella*, as this species always is when it seeds at all.

The history of the fruiting of the *Yucca angustifolia* is as follows: It flowered in 1875 but produced no fruit. In 1876 the early flowers proving infertile, I applied the flower's own pollen to the apex of the pistil of the four last flowers that opened; these produced the four capsules examined by Professor Riley as already noticed. In 1877, noticing that the Pronuba abounded in the flowers, no hand application was made, and there was no fruit. In 1878 the flowers were again left to the insects with no fruitful results. The past season pollenization by hand was resorted to, and the numerous seed vessels I exhibit followed. As the pollen was merely applied to the papillose apex it shows that in this species the elaborate and wonderful ingenuity of the insect in applying pollen as described by our friend is wholly unnecessary."

Fungi on Forest Trees.—In Part I of the Trans. Mass. Hort. Soc. for 1879, we find a lecture delivered by Dr. W. G. Farlow, Prof. of Cryptogamic Botany in Harvard University, upon the "Diseases of Forest trees."

"He said that it was difficult to define disease in trees, as well as in man. Plants, unlike animals, are not subject to functional diseases but only to such as in animals are accompanied by alterations in the tissues. The diseases of trees progress slowly, but go on for many years. They may be divided into three classes: first, those caused by insects; second, those caused by fungi; and, third, those called spontaneous, a term used to express our ignorance of their cause. Prof. Farlow said that he should omit the first and third classes, and speak only of the diseases caused by fungi.

Every fungus consists of two parts, the vegetative and the fructifying. The former appears in the shape of white threads, known as mycelium, and the fruit consists of bodies more or less round, and called by the general name of spores. Fungi are divided into several large groups or orders, most of which include species which attack trees. In mushrooms or toadstools the cap is only an arrangement for bearing the fruit. Of the toadstools which grow upon trees, many do considerable harm. The most common of those found upon trees is the *Agaricus melleus*, or, as it is called in Germany, *hallimasch*. The cap, which is the most prominent part, is not that which does the injury, but the delicate cells of the mycelium penetrate the wood and cause a rotting—not to be confounded with what is vulgarly called dry rot. A specimen of the mycelium, looking like dirty paper or felt, was shown by Prof. Farlow. Another was shown

in a hardened condition, looking like roots. The spores of this species fall on the bark, and grow there. The mycelium will not stand the cold until the threads of which it is composed assume a black and hardened condition. In warm weather the hardened mass softens again. This fungus is instructive because it is so injurious to forest trees, and shows its changes so plainly. The punks all belong to the same class with the mushrooms. A specimen was shown, which, unlike the mushrooms, grew laterally from the tree, without any stalk. Another species was shown, consisting of finger-shaped masses, with flocculent masses attached, and having the spores in pits, covering the whole surface. This is the type of another large class, and is a help to those who clear land of wood. It absorbs the cells and cell walls, until the whole mass rots away. Another fungus, which was shown, is known as Indian paint. It was cut from a piece of bark, the remnant of the tree on which the fungus grew, but of which only traces of the trunk were left. The red color from which this species takes its name is caused by decay of the cells of the bark. Another species from San Bernardino Pass, also called Indian paint, was shown. The color of this is caused by the spores, but it is doubtful whether the species last shown was ever really used for paint.

Fungi closely related to the blights and rusts on wheat and other grain, are also found on trees, where their character is more permanent, and where they cause some of the most important diseases. A portion of the swollen trunk of a pine from California was shown, having a fungus of a pale yellow color, which, when fresh, was a brilliant red. The branches of the white cedar and other conifers, are found distorted into a mass resembling a nest in appearance, which is caused by a rust.

The rusts show great variations in character, and pass through transformations, like insects. One called the red cedar apple, late in May consists of a bright orange-colored mass. When dry, it is smaller and of a brownish color, consisting of swollen stems of cedar, from which the conical substance of the fungus projects. It is very gelatinous, and in rainy weather swells up into the orange-colored mass, consisting of spores. In three or four weeks, or earlier in a heavy rain, the mass is washed away, and the contents of the cells pass out into tubes, which give out other bodies. These bodies, sown on the leaves of hawthorn, crab, or mountain ash, produce a secondary form, appearing in red patches on the upper sides of the leaves. These patches consist of horn-shaped bodies, which are sacs,

and come from threads which grew from the spores. These sacs contain one-celled spores, which when sown on the red cedar produce the original form. This is one of the simplest kinds of rusts. Its different forms were shown by magnified and colored diagrams, and an incidental view was given of sacs on the upper side of the leaves. It will be seen from this that in studying rusts on forest trees we must study two kinds of trees.

Rusts produce distortions of the stems of trees. One species, which grows out into orange-colored points, causes a slight swelling the first year, after which the points drop off, the mycelium remaining behind. The tree tries to grow around the swelling, but the spawn grows through the wood, and the tree again attempts to grow around it. The result, in a few years, is a swelling which remains after the fungus dies. Another fungus, which looks like a brownish mass, and swells up when moistened, produces so large a knot as to cut off the nourishment from the branch above, which consequently dies, and is blown off by the wind. Such branches are called by the Germans *hexenbesen*, or witches' brooms."

Comparative Anatomy of Leaves.—The writer was very much interested last summer, while attending Prof. Goodale's summer school, in a study of the various distribution of fibro-vascular bundles in stems, in roots, in petioles, in the leaves of *Coniferæ*, etc. For the purpose of suggesting a line of investigation to such as have like tastes and suitable instruments, the following review, by Dr. Gray, of a late memoir of Casimir DeCandolle, is copied from the Amer. Jour. of Science and Arts.

"One of Casimir DeCandolle's earliest studies was into the structure and relations of the fibro-vascular elements of the leaf, and the results and deductions were brought out in his brief article entitled *Theorie de la Feuille*, in the year 1858. The present paper is in no respect theoretical, nor does it investigate the minute anatomy and formation of the vascular bundles. But it presents a comparative view of the general structure of the woody system of the petiole and principal veins in a very considerable number of Dicotyledons, mainly trees, and belonging to different natural orders. In this way the nature of the principal differences from species to species, and from one order to another, are brought to view, and the taxonomical value of such characters indicated. It is found that different species of the genus sometimes accord, but sometimes differ notably in this part of their anatomy. Wherefore the classificatory importance of these dif-

ferences is low, yet they may often be turned to good account in the discrimination of related species. The essential fibro-vascular system of the petiole, as displayed on a cross-section, forms either a closed ring or an arc open superiorly between the outer or cortical and the inner or medullary tissue; in the first case it is said to be closed or complete, in the second open or incomplete. Very commonly this is the only vascular system of the petiole, ribs, or veins. Not rarely there are additional or accessory bundles, sometimes external to the essential system, or *intracortical*; sometimes within the arc or ring, or *intramedullary;* occasionally there are both intracortical and intramedullary bundles. Generally plants of the same order will agree, at least approximately, in having the closed or open system, and in having or wanting the accessory bundles without or within. But, while *Acer Pseudo-platanus* has a well developed intramedullery cord, *A. platanoides* has none, and in general the Maples are divided in this respect quite independent of other characters; and the difference is similar and equally marked between the species of *Æsculus*. The oaks, which have been made a special study in this regard, appear to be somewhat equally divided between species provided with and those destitute of intramedullery bundles; but related species generally belong to the same category, yet not always. For in one case two species, of doubtful distinction until now, are confirmed by the discovery of an anatomical difference of this sort. All the Birches examined want the intracortical bundles and the principal system forms an open arc, and one or two Alders nearly agree with them; while the others have a closed ring and are furnished with intracortical bundles."

Notes from Colorado.—There seems to be much confusion about the two species of *Oxytropis* found on the plains. No. 73 of my Colorado collection, named by Dr. Gray *O. Lamberti*, is of interest because it is the "Loco" so dreaded by stock men for its poisonous properties. No. 14 is *O. campestris* and a full description of the two would show that they differ materially from the two species of Gray's Manual and the Synopsis in King's Report.

Malvastrum coccineum is poisonous. Mr. Ruble, a stock man of Pueblo, lost twelve hundred sheep in four hours from eating this plant, in October of this year. Specimens of the plant were sent me, which prove to be the above without any doubt. The Agricultural Department at Washington has received similar reports from other sources, on the poisonous properties of this plant.

Neillia opulifolia, Benth., seems to be distinguished from *N. Torreyi*, Watson, by its glabrous pods. I collected a large number of pods of *N. opulifolia* this season and find that those of the smaller forms are shining with scattered woolly hairs, but those of the large forms (four to six feet high), found on the plains at the base of the foot-hills, are woolly and the leaves are large, slightly lobed and crenate. I notice that the pubescence of both species is stellate under the microscope. The pedicels of both species are either slender and long or thick and short, and are often almost glabrous.

Grindelia squarrosa, Dunal, is occasionally rayless, with larger heads.

I have a few fronds of *Cryptogramme acrostichoides*, R. Br., fertile below and sterile above, after the manner of *Onoclea sensibilis*, var. *obtusilobata*.

Aquilegia chrysantha, Gray, seems hardly distinct from *A. cœrulea*, for the flowers are lavender often, sepals broadly ovate, broader than the petals; but with the small flowers and small leaves of *A. chrysantha* occasionally I have found both colors of flowers on different stems from the same root. The leaves are sometimes larger with the same small flowers, or small with much larger flowers. At Colorado Springs it is a low altitude plant, seldom reaching 7,500 feet. Similar observations were made by Rothrock of the Wheeler Survey.

Among the interesting plants collected by me in Colorado this season I notice the rare *Psoralea hypogæa*, Nutt., a *Helianthemum* apparently new but not in flower, *Ampelopsis quinquefolia*, Mx., with boat-shaped cucullate petals that do not fall as soon as they open, but remain for some time, and leaves with falcate tips, it may prove to be a good variety. Also *Astragalus Pattersoni*, Gray, a variety of *Potentilla Pennsylvanica*, L., not *strigosa;* erect, tall, leaflets pinnate, simply toothed, not revolute. Also *Asclepias Hallii*, Gray, *Suæda fruticosa*, var. (King's Rep.). *Smilax herbacea*, L., var. *inodora* seems sufficiently distinct to rank as a variety; scentless; seeds, three; leaves with five prominent ribs, the other two or four less prominent or reduced to irregular lines on the margin; leaves smooth on both sides except short white hairs on the reticulations beneath; otherwise as the typical form. The plant was collected June 18, 1879.

I have also quite a number of new Fungi already described in the Gazette.—Marcus E. Jones.

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